

## CASE REPORT

## Single-rooted primary first mandibular molar

SelvaKumar Haridoss,<sup>1</sup> Kavitha Swaminathan,<sup>2</sup> Vijayakumar Rajendran,<sup>1</sup> Bharathan Rajendran<sup>3</sup><sup>1</sup>Department of Pedodontics, SRM Dental College, Chennai, Tamil Nadu, India<sup>2</sup>Department of Pedodontics, Sri Ramachandra University, Chennai, Tamil Nadu, India<sup>3</sup>Sri Ramakrishna Dental College and Hospital, Coimbatore, Tamil Nadu, India**Correspondence to**

Professor SelvaKumar Haridoss, selvakumarh21@gmail.com

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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.<sup>1</sup> 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.<sup>2</sup> Developmental anomalies may occur during any stage of tooth development.<sup>3</sup> A number of terms have been used to describe single-rooted molars like conical, fused and pyramidal.<sup>4</sup> 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 post-operative 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.<sup>8</sup> Conical single roots or canal systems are also a rare occurrence and are rarely mentioned in studies.<sup>9</sup> 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 <i>et al</i> <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 <i>et al</i> <sup>33</sup>	2013	1	Bilateral mandibular first molars

**Table 2** Case reports of single-rooted primary molars in Ellis-van Creveld 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.

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### REFERENCES

- 1 TenCate's AR. *Oral histology: development, structure, and function*. 4th edn. St Louis: Mosby, 1994:104–7.
- 2 Holan G, Chosack A. Single-rooted molars in the primary and permanent dentition in two siblings: case report. *Pediatr Dent* 1991;13:369–9.
- 3 Somanes JV, Southam JC. *Disorder of development of teeth*. *Oral pathology*. 3rd edn. New York: Oxford University Press, 1998:1–17.
- 4 Ackerman JL, Ackerman AL, Ackerman AB. Taurodont, pyramidal and fused molar roots associated with other anomalies in kindred. *Am J Phys Anthropol* 1973;38:681–94.
- 5 Kothapalli KR. Two-rooted mandibular first premolar: case report. *Ann Essences Dent* 2010;2:93–5.
- 6 Fava LR, Weinfeld I, Fabri FP, *et al*. Four second molars with single roots and single canals in the same patient. *Int Endod J* 2002;33:138–42.
- 7 Slowey RR. Radiographic aids in the detection of extra root canals. *Oral Surg Oral Med Oral Pathol* 1974;37:762–72.
- 8 Gutz D. Morphology of the primary dentition. In: Forrester DJ, Wangler ML, Fleming J, eds *Pediatric Dental Medicine*. Philadelphia: Library of Congress cataloguing in publication Data, 1981:71–80.
- 9 Okamura T. Anatomy of the root canals. *J Am Dent Assoc* 1927;14:632–6.

- 10 Fava LRG, Weinfeld I, Fabri FP, *et al.* Four second molars with single roots and single canals in the same patient. *Int Endod J* 2000;33:138–42.
- 11 Robbins IM, Keene HJ. Multiple morphologic dental anomalies: report of a case. *Oral Surg Oral Med Oral Path Oral Radiol Endod* 1964;17:683–90.
- 12 Winter GB, Brook AH. Tooth abnormalities. In: *A companion to dental studies, Volume 3. Clinical dentistry*. Oxford: Blackwell Scientific Publications, 1989:55–104.
- 13 Sabala CL, Benenati FW, Neas BR. Bilateral root or root canal aberrations in a dental school patient population. *J Endod* 1994;20:38–42.
- 14 Paulsen HU, Shi XQ, Welander U, *et al.* Eruption pattern of auto-transplanted premolars visualized by radiographic color-coding. *Am J Orthod Dentofacial Orthop* 2001;119:338–45.
- 15 Mostowska A, Kobiela A, Biedziak B, *et al.* Novel mutation in the paired box sequence of PAX9 gene in a sporadic form of oligodontia. *Eur J Oral Sci* 2003;111:272–6.
- 16 Steele-Perkins G, Butz KG, Lyons GE, *et al.* Essential role for NFI-C/CTF transcription-replication factor in tooth root development. *Mol Cell Biol* 2003;23:1075–84.
- 17 Sarkar S, Rao P. Number of root canals, their shape, configuration, accessory root canals in radicular pulp morphology. A preliminary study. *J Indian Soc Pedod Prev Dent* 2002;20:93–7.
- 18 Zoremchingi J, Joseph T, Varma B, *et al.* A study of root canal morphology of human primary molars using computerised tomography: an in vitro study. *J Indian Soc Ped Prev dent* 2005;23:7–12.
- 19 Gupta D, Grewal N. Root canal configuration of deciduous mandibular first molars—an in vitro study. *J Indian Soc Pedo Prev Dent* 2005;23:134–7.
- 20 Naser Aminabadi A, Ramin Farahani MZ, Esrafil Gajan B. Study of root canal accessibility in human primary molars. *J Oral Sci* 2008;50:69–74.
- 21 Bagherian A, Kalhori KA, Sadeghi M, *et al.* An in vitro study of root and canal morphology of human deciduous molars in an Iranian population. *J Oral Sci* 2010;52:397–403.
- 22 Mesbahi M, Talei Z, Mollaverdi F, *et al.* Comparison of root canal system configuration in primary teeth. *Res J Biol Sci* 2010;5:488–91.
- 23 Yang R, Yang C, Liu Y, *et al.* Evaluate root and canal morphology of primary mandibular second molars in Chinese individuals by using cone-beam computed tomography. *J Formos Med Assoc* 2013;7:390–95.
- 24 Gaurav V, Srivastava N, Rana V, *et al.* A study of root canal morphology of human primary incisors and molars using cone beam computerized tomography: an in vitro study. *J Indian Soc Pedo Prev Dent* 2013;31:254–9.
- 25 Wang Y-L, Chang H-H, Kuo C, *et al.* A study on the root canal morphology of primary molars by high-resolution computed tomography. *J Dent Sci* 2013;8:321–7.
- 26 Vijayakumar R, Selvakumar H, Swaminathan K, *et al.* Root canal morphology of human primary maxillary molars in Indian population using spiral computed tomography scan: an in vitro study. *SRM J Res Dent Sci* 2013;4:139–42.
- 27 Nguyen AH, Tiffée JC, Arnold RM. Pyramidal molar roots and canine-like dental morphologic features in multiple family members: a case report. *Oral Surg Oral Med Oral Path Oral Radiol Endod* 1996;82:411–16.
- 28 Ballal S, Gupta T, Kandasamy. Management of a retained primary maxillary second molar with C-shaped canal confirmed with the help of spiral computed tomography.—a case report. *Endodontology* 2006;2:14–19.
- 29 Manoj Kumar MG, Sai Sankar AJ, Srikanth RK. Pyramidal molar roots in primary and permanent dentition along with non syndromic oligodontia in a 11 year old boy. *Ann Essences Dent* 2010;2:36–9.
- 30 Jeevanandan G, Subramanian E, Muthu MS. Single-rooted primary first molars. *Indian J Dent Res* 2012;23:104–6.
- 31 Nagaveni NB. An unusual occurrence of multiple dental anomalies in a single nonsyndromic patient: a case report. *Case Rep Dent* 2012;2012:426091.
- 32 Chaudhari P, Mallikarjuna R, Swadas M, *et al.* Unilateral single-rooted primary mandibular first molar. *BMJ Case Rep* 2013;2013.
- 33 Subhadra HN, Sevakar SA, Prabhakar AR. Bilateral single rooted mandibular first primary molars. *J Contemp Dent* 2013;3:151–2.
- 34 Cahuana A, Palma C, Gonzales W, *et al.* Oral manifestations in Ellis-van Creveld syndrome: report of five cases. *Pediatr Dent* 2004;26:277–82.
- 35 Vinay C, Reddy RS, Uloopi KS, *et al.* Clinical manifestations of Ellis-van Creveld syndrome. *J Indian Soc Pedod Prev Dent* 2009;27:256–9.
- 36 Aminabadi NA, Ebrahim A, Oskouei SG. Chondroectodermal dysplasia (Ellis-van Creveld syndrome): a case report. *J Oral Sci* 2010;52:333–6.
- 37 Kalaskar R, Kalaskar AR. Oral manifestations of Ellis-van Creveld syndrome. *Contemp Clin Dent* 2012;3(Suppl 1):S55–9.

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