

## CASE REPORT

# Single rooted primary first molar with nonsyndromic hypodontia: A rare case report

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## ABSTRACT

Dental anomalies of number, shape and size are the most common to dental literature, the most common being the agenesis and morphologic dental anomalies. However, very few cases have been reported regarding the presence of single root in primary molars. The purpose of this article was to present a rare case of single root in primary mandibular first molar associated with nonsyndromic hypodontia.

**Key words:** Hypodontia, primary dentition, single rooted molar

## INTRODUCTION

Development of dentition is a multi-interactive procedure involving complex permutations between epithelial and mesenchymal cells that regulate all the processes of odontogenesis including initiation, morphogenesis and differentiation which in turn determine the positions, numbers and shapes of different types of teeth.<sup>[1]</sup> Agenesis can be described as hypodontia: when one or few teeth are missing; oligodontia: when six or more teeth are absent and anodontia: when there is total absence of teeth. The prevalence of hypodontia is 1.6–9.6% in the permanent dentition and 0.1–0.9% in primary dentition with mandibular second premolar being the most frequently involved tooth and the canines or first permanent molars the least involved teeth.<sup>[2]</sup>

Primary molars are mostly multi-rooted with the primary maxillary molars usually having three roots and primary mandibular molars are having two roots.<sup>[3]</sup> Root anomalies in the primary dentition are quite rare and most of them include concrescence, dilacerations or hypercementosis.<sup>[4]</sup> The incidence of root morphological variation especially single rooted primary molar in the primary dentition is not very distinctively documented. Ackerman *et al.* were the first to document such a malformation in primary molars and termed single roots as “pyramidal,” “cuneiform,” “tubular,” “cylindrical,” “prismatic” and “conical.”<sup>[5]</sup> Etiology of a dysmorphological roots can be attributed to genetic or

environmental factors which leads to failure of invagination of derivatives of enamel organ during the process of root formation. This report presents a rare case of single rooted primary first mandibular molar with nonsyndromic hypodontia.

## CASE REPORT

A 10-year-old boy reported to the Department of Pediatric Dentistry, with a chief complaint of mobile teeth in maxillary and mandibular posterior region and wanted to get them extracted. The medical history of the patient was noncontributory and no abnormality was detected on extra-oral examination. Intraoral examination revealed preshedding mobility in relation to all the present primary teeth, which included the maxillary second molar in the first quadrant, mandibular second molar in the third quadrant and mandibular first and second molar in the fourth quadrant. All the other teeth present in the oral cavity were normal.

During the examination, it was found that maxillary second premolars were not present in the oral cavity and hence a radiograph was done to confirm the clinical findings. An orthopantomogram (OPG) was advised as it would cover the entire dentition and make visible any tooth abnormalities and also help us determine the eruptive status of other permanent teeth. The OPG revealed two very interesting findings, first as

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suspected the maxillary second premolars were missing along with the absence of right mandibular second molar. Second the right primary mandibular first molar was single rooted which is an extreme rarity [Figure 1]. The clinical and radiographic diagnosis, thus, confirming the case of hypodontia with root dysmorphism. A thorough examination of all tissues of the child-like skin, nails, ears, etc. and familial history revealed no contributory findings thus confirming the case of nonsyndromic hypodontia.

As the main reporting problem of the patient was mobile teeth which caused him discomfort and difficulty in eating it was decided to extract all primary teeth including the single rooted primary molar. Upon extraction, the single rooted molar was sent for histopathology examination. The sectioning of the tooth was performed and it revealed one single root and root canal [Figure 2] and the histological ground section under  $\times 10$  magnification [Figure 3] supported our findings of single rooted primary mandibular first molar. The patient is asymptomatic and is on follow-up so as to review the eruption status of permanent teeth.

## DISCUSSION

The role of genetics is documented and accepted to have an influence on tooth agenesis as genes directly influence the proteins and their signaling molecules are essential for tooth development. Any mutation in this would lead to various malformations and tooth agenesis. Since most of these proteins are involved in different functions of development, a defect in one could lead to multiple problems like agenesis, delayed eruption and shape or size malformation.

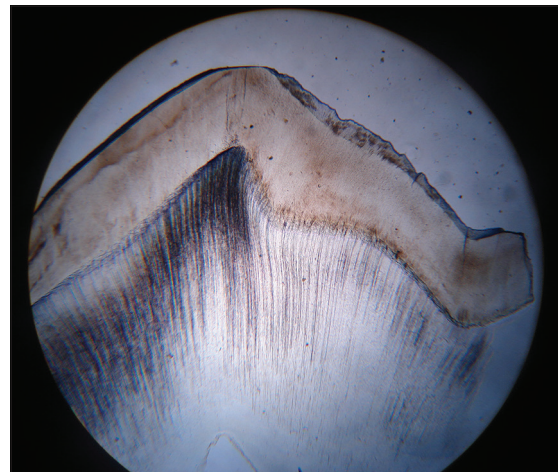
Hypodontia can either be isolated (nonsyndromic) or be associated with syndromes like ectodermal dysplasia. The main etiopathogenesis of hypodontia is the failure of proliferation of the tooth bud cells from the dental lamina due to disruption of the dental lamina, space limitation and functional abnormalities of the dental epithelium or failure of initiation of the underlying mesenchyme, which is caused by environmental or genetic factors. The environmental factors include irradiation, tumors, trauma, hormonal influences, rubella infection and thalidomide factors,<sup>[3]</sup> whereas genetically nonsyndromic hypodontia is an autosomal recessive or dominant X-linked disorder. The two genes mostly documented in the case of hypodontia are *MSX1* and *PAX9* genes as these two are essential in tooth development. Among these two, the mutations of *PAX9* gene, mapped to 14q12-q13 have mostly been linked with a nonsyndromic form of tooth agenesis.<sup>[6,7]</sup> Any form of tooth malformations can be differentiated as syndromic and nonsyndromic based upon a comprehensive medical examination encompassing hairs, nails, sweat glands, eyes and also by checking for any congenital disorders. In the present case, the patient was totally asymptomatic without any notable findings for



**Figure 1:** Orthopantomogram exhibiting single rooted primary mandibular first molar and missing maxillary second premolars and right mandibular second molar



**Figure 2:** Sectioning of the tooth revealing one root and root canal



**Figure 3:** Histological ground section of crown of tooth (Ground section,  $\times 100$ )

above-mentioned tissues hence was a case of nonsyndromic hypodontia.

Single rooted mandibular molars are more frequently found in the permanent dentition and the most frequent causes include taurodontism or fused roots. The incidence of

single rooted primary mandibular molars is very rare and only five such cases have been documented in literature with Ackerman *et al.*,<sup>[5]</sup> 1973 being the first and Holan and Chosack,<sup>[8]</sup> Nguyen *et al.*,<sup>[9]</sup> Jeevanandan *et al.* and<sup>[10]</sup> Bahrololoomi *et al.*,<sup>[11]</sup> reporting it thereafter. The reported cases document a female predilection for single root anomalies as compared to males although no reason has been substantiated for the same.<sup>[12]</sup> Presented in this case report, is the rare citation of single root in primary mandibular first molar with the histological ground section confirming it as an isolated malformation and not a fusion of two roots of the molar tooth. For the development of root to take place the two extensions from the lateral wall of root sheath grows toward the center of the dental papilla, thus, dividing the root into two halves. The reason for dysmorphological roots is due to failure of invagination of Hertwig's epithelial root sheath during the process of tooth development. This results in failure of lateral projections which divide for double root formation thus leading to an undivided single root and root canal.<sup>[10,13]</sup> The role of genetic control in case of root malformations is as important as in tooth agenesis. Steele-Perkins *et al.*,<sup>[14]</sup> 2003 have documented the role of gene NFI-C in agenesis of molar roots in mice, but the literature regarding root agenesis or malformations in human teeth is very scarce.

The identification and diagnosis of single rooted molar are of importance clinically and endodontically. These teeth must be treated as their normal counterparts although some of the factors to be taken into consideration while treating the tooth endodontically are the outline form of access opening, size of pulp chamber and presence of accessory canals in the apical area. In the present case, it was decided to extract the primary mandibular first molar tooth as it was exhibiting preshedding mobility owing to the age of the patient. The diagnosis and treatment plan in cases of hypodontia is of great importance as these cases are mostly associated with psychological, esthetic and functional problems, which may be the cause or sequelae of malocclusion. The diagnosis of single rooted molar in primary dentition is of importance as it will not only add to the existent scant literature but also help in identification and management of such teeth; however the genetic expression of root morphological variations needs to be investigated in greater depth to have a better understanding of the root agenesis.

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## Conflicts of interest

There are no conflicts of interest.

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