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## **CASE REPORT**

# **Agensis of the Maxillary First Permanent Molars: A Clinical and Radiographic Evaluation of a Rare Case**

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## **ABSTRACT**

Congenitally missing first permanent maxillary molars is a rare finding in any given population. The reported prevalence rate of maxillary first molar agensis ranges from 0.2 to 1.5%. The exact aetiology of this dental anomaly is not clearly documented. Generally, it can occur in association with other dental disturbances. The purpose of this article is to describe the clinical and radiographic evaluation of a case with bilateral congenitally missing first permanent molars and its association with dental anomalies such as microdontia and hypodontia.

**Keywords:** agensis, first permanent molar, hypodontia, microdontia

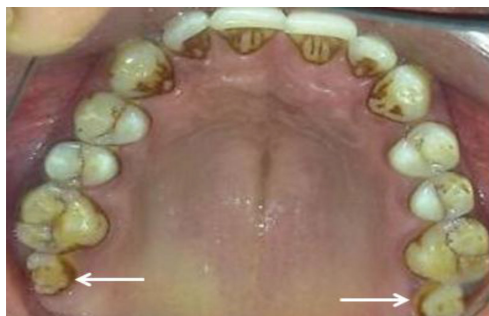
## **INTRODUCTION**

The absence of one, or more teeth is known as oligodontia, and a total absence of teeth is called anodontia. However, many researchers prefer the term agensis as it more accurately describes the developmental disorder.<sup>1,2</sup> Agensis of the teeth may also be influenced by genetic factors with a marked degree of penetrance.<sup>3</sup> The number of missing teeth in the dentition would thus signify an attempt by nature to fit the teeth into a shortened dental arch.<sup>4</sup> The aetiology of agensis is not clearly documented and various researchers in published literature have described several hypotheses. The most commonly missing teeth in the posterior region of the arches are the third molars, whereas in the anterior region it is the maxillary lateral incisors and mandibular central incisors.<sup>5</sup> A meta-analysis found that dental agensis in Australia and Europe is higher than in North America and is more commonly seen in females than males. It was reported that the mandibular second premolars are most commonly affected by tooth agensis followed by the maxillary lateral incisors and maxillary second premolars.<sup>6</sup>

Large variations amongst the prevalence of missing teeth reported in English literature are common and vary between 0.38% and 36.5%.<sup>10</sup> However in many of the studies, sample size was not adequate and as such the data presented in the literature has not been analysed using an integrated approach.<sup>5</sup> After the third molars, the mandibular second premolar has been reported as the most commonly missing tooth in Caucasians, whereas in the majority of Asian populations it is lateral incisors. The agensis of first permanent molars in the maxillary arch is very rare. This study reports a rare case of congenitally missing maxillary first permanent molars with radiographic evaluations and its associated dental anomalies.

## **CASE REPORT**

A 28-year-old male patient visited the clinic with a chief complaint of calculus deposits on his teeth. His past medical and dental histories did not reveal any significant findings. Intraoral examination revealed a permanent dentition with two missing maxillary molars, bilateral microdontic third molars, and very poor oral



**Figure 1.** An intraoral maxillary view showing agenesia of the first permanent molars and microdontic third molars



**Figure 2.** The panoramic radiograph showing agenesia of teeth 16, 26, 38, and 48 (dashed arrow), microdontic teeth 18 and 28 (arrow), and mesial movement of the 17 and 27

hygiene maintenance (Figure 1). On radiographic examination, a panoramic radiograph confirmed the missing first maxillary molars and bilateral microdontic third molars (Figure 2). In the mandibular arch a well-circumscribed radiolucency was evident involving the roots of 33 and 34. Based on the morphology found in both the clinical and radiographic examinations, the missing molars were identified as first permanent molars. After a multidisciplinary evaluation the patient was referred to the Department of Endodontics for treatment in relation to 33 and 34.

## DISCUSSION

Hypodontia, the agenesia or congenital absence of one or more permanent teeth, is the most common developmental numerical anomaly in humans. It has a prevalence of 5.5% in Europeans, with a preference for females over males, and the most commonly missing tooth is the second premolar.<sup>7,8</sup> However, in Asian populations the maxillary lateral incisor is the most commonly missing tooth.<sup>9</sup> Tooth size discrepancy and variations in tooth shape are also common findings in severe hypodontia.<sup>9</sup> It was reported that there are no significant associations between maxillary first molar agenesia and other dental anomalies, except for the agenesia of other teeth in Japanese populations.<sup>8</sup> In contrast, two case studies reported that supernumerary teeth are associated with agenesia of the first maxillary permanent molars.<sup>10,11</sup> In the present case, agenesia of the first permanent molars was associated with microdontia of the third molars in the maxillary arch. Agenesia of the maxillary first molars is associated with a higher prevalence of other permanent tooth agenesia and advanced tooth agenesia. As such, congenitally missing both mandibular third molars along with the first permanent maxillary molars were evident in the present case. Previously, there has been no association between maxillary first molar agenesia and supernumerary teeth, tooth shape abnormalities, and

ectopic eruptions. However, agenesia of the maxillary first permanent molars was indeed associated with microdontic third molars and is documented in the present report. Similarly, Ranta reported bilateral agenesia of the first permanent molars, along with the presence of supplement lateral incisors in a patient with Dowbitz syndrome.<sup>11</sup> A study from Japan reported that subjects with unilateral and bilateral agenesia of the maxillary first molars had a significantly higher prevalence rate of third molar agenesia than those without agenesia of the maxillary first molars.<sup>1</sup> The authors concluded that maxillary first molar agenesia and third molar agenesia are different phenotypes of the same genetic defect and results from the present case suggest similar findings. Certain studies and case reports have shown a significant association between third molar agenesia and agenesia of the other teeth, particularly the second premolars and lateral incisors.<sup>1,6-8</sup> Agenesia of the first molars bilaterally is associated with microdontia in the present case. This is contradictory to findings of the Japanese study where the authors found no association between maxillary first molar agenesia and supernumerary teeth, tooth shape abnormalities, and ectopic tooth eruption.<sup>1</sup>

Early diagnosis of agenesia of teeth is essential, as it often requires multidisciplinary treatment planning to address all treatment options. Agenesia of the maxillary first permanent molars may allow favourable eruption of the second permanent molars into the maxillary arch, rather than mesial tipping or ectopic eruption.<sup>6</sup> It has been hypothesised that conical roots of the maxillary second permanent molars can cause the mesio-lingual rotation of the tooth. This was evident in all cases used in the present report. Additionally, radiographic evaluation showed agenesia of the third molars and premolars, and microdontic third molars and lateral incisors in the present report. Further study is required and comprehensive surveys of populations with congenitally missing first permanent maxillary molars are required.

## CONCLUSION

The agenesis of the first permanent molars in the maxillary arch is an extremely rare condition. Agenesis of the first permanent molars may be associated with microdontia, hypodontia, and taurodontism of the second permanent molars. This is the first Indian subject to report with this condition in association with other dental anomalies. However further research is needed to confirm this hypothesis.

## CONFLICT OF INTEREST

The authors declare no conflict of interests.

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