



## Bilateral agenesis of maxillary second premolars and bilateral ectopic eruption of mandibular first molars – A rare case report

\*Dr. Nagaveni NB<sup>1,2,3</sup>

<sup>1</sup>Consultant Pedodontist, “Garike Dental Care”, Davangere, Karnataka, India

<sup>2</sup>Consultant Pedodontist, Karnataka ENT Hospital and Research Centre, Chitradurga, Karnataka, India.

<sup>3</sup>Professor, Department of Pediatric and Preventive Dentistry, College of Dental Sciences, Davangere, Karnataka, India

DOI: 10.5281/zenodo.10067075

Submission Date: 22 Sept. 2023 | Published Date: 31 Oct. 2023

\*Corresponding author: Dr. Nagaveni NB

Consultant Pedodontist, “Garike Dental Care”, Davangere, Karnataka, India

### Abstract

Agenesis of the tooth is the dental anomaly involving tooth development, whereas ectopic eruption is the dental phenomenon encompassing the process of tooth eruption of a particular tooth from the alveolar crypt into the oral cavity. These two are entirely different clinical entities rarely seen during clinical practice as an isolated finding. The present article shows the concomitant occurrence of congenital, idiopathic bilateral agenesis of permanent maxillary second premolars and bilateral ectopic eruption involving permanent mandibular first molars in an 8-year-old Indian male patient.

**Keywords:** Congenital; Dental variation; Ectopic eruption; Mandibular first molars; Second premolar; Tooth agenesis

## INTRODUCTION

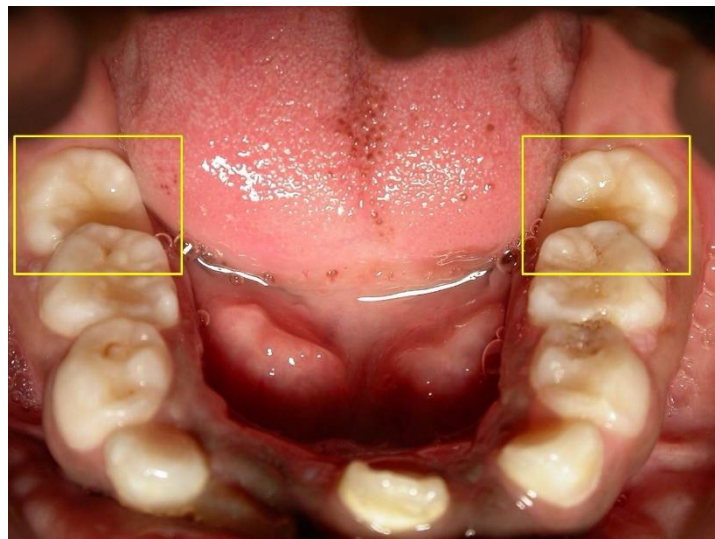
Ectopic eruption of the first permanent molar is an uncommon tooth eruption anomaly involving the local eruption disturbance characterized by abnormal eruptive pathway of first permanent molars causing the permanent tooth to be locked under the distal undercut of the second primary molar and failure of eruption into normal occlusal plane [1]. This disorder related to tooth eruption phenomenon, is usually occurs during mixed dentition stage and hence it is seen in children aged between 5 to 7 years [2]. During this period the permanent first molars are guided in the stable and functional occlusion using the distal aspect of primary second molars as an eruption guide. The most frequently affected teeth by this process are the maxillary first permanent molars and canines followed by mandibular canines and second premolars and maxillary lateral incisors [3]. This condition is more frequently encountered in cleft lip and palate children as compared to normal children, found with a prevalence of 21.8% and 4.3%. It occurs 25 times more frequently in the maxilla as compared to mandible reported with a prevalence of 2% to 6%. Although exact etiology behind occurrence of this condition is not known, different possible etiological factors have been suggested in the literature like availability of the space and rotation of tooth buds, injury to developing tooth bud, rate of primary teeth root resorption, presence of supernumerary tooth, discrepancy in the tooth size-arch length and morphology of the tooth [4]. Chapman in 1923 defined ectopic eruption of the permanent mandibular first molar as a “disturbance in the eruptive path of a tooth in an abnormal position” [5].

Congenital agenesis of tooth is the most commonly encountered dental abnormality in day to day life. Agenesis of second premolars is more common in the mandible seen with a prevalence of 4.4% in contrast to its absence in the maxilla which is of 1.7% [6]. In the general population the prevalence of maxillary second premolars agenesis is reported as 1.5% and it is less frequent compared to mandibular premolars and maxillary lateral incisors [7,8]. In this paper, author intends to show the concomitant occurrence of bilateral congenital agenesis of permanent maxillary second premolars and bilateral occurrence of ectopic eruption of permanent first molars. This combination of two different tooth anomalies is not reported so far in the dental literature according to the best of author’s knowledge.

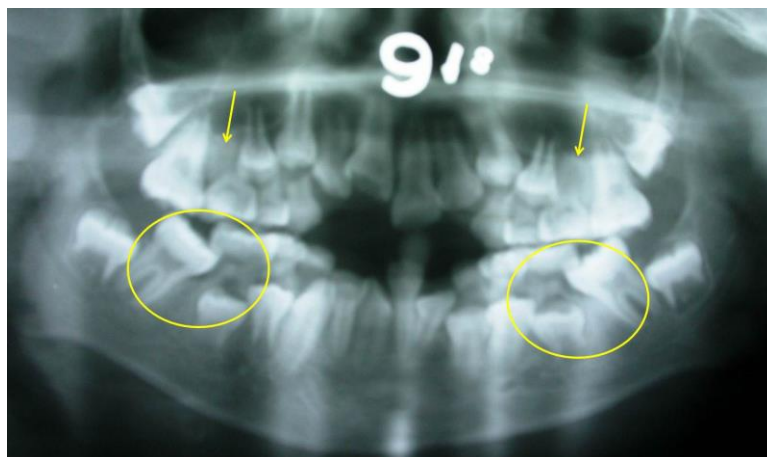
## Case report

An 8-year-old male patient reported to a private dental clinic complaining of delay in the eruption of lower front teeth. On physical examination, patient was moderately built and well nourished. There was no history of any trauma to the lower front region. Patient did not show signs and symptoms of any systemic, metabolic or syndromic conditions. Patient mother stated that after the exfoliation of milk teeth, lower front new set of permanent teeth have not erupted. Patient was subjected to intraoral examination which showed presence of partially erupted mandibular left central incisor. Permanent right central incisor and right and left lateral incisors were still not erupted clinically. Patient oral hygiene was moderate. On further examination, lower both right and left permanent first molars appeared locked under the mesial half of crown part of the primary second molars (Figure 1). In the upper arch, right central incisor was also not yet erupted. To rule out the presence of lower front teeth an orthopantomograph radiograph was advised. Examination of orthopantomograph (Figure 2) revealed presence of mandibular anterior teeth buds in the erupting stage and mesial inclination of both first permanent molars under the distal aspect of primary second molars. There was evidence of root resorption involving distal root of the both primary second molars. Following further observation of the radiograph, congenital absence of permanent maxillary right and left second premolar tooth buds were apparent. All other permanent teeth buds were visible on the radiograph. Considering the clinical features, radiographic findings and literature search, the present case was diagnosed as congenital, idiopathic bilateral agenesis of maxillary second premolars in association with bilateral ectopic eruption of mandibular first molars. Patient's mother was informed about the dental conditions present in the child and explained about the possible complications and different treatment options for the existing conditions. As patient's mother was concerned with the presence of tooth buds in the lower anterior region and did not will for the treatment of other dental problems, presence of permanent anterior teeth was informed for the parents and advised them to wait till their eruption into the oral cavity.

**Figure 1: Intra-oral photograph showing mesial locking of right and left mandibular first molars under primary second molars (yellow squares).**



**Figure 2: Orthopantomograph radiograph depicting agenesis of maxillary right and left second premolars (yellow arrows) and bilateral ectopic eruption of permanent mandibular first molars (yellow circles).**



## DISCUSSION

Early recognition and meticulous diagnosis of the all erupting permanent first molars either in mandibular or maxillary arch is very important in children to rule out from various eruption problems relating to the tooth. Ectopic eruption of the permanent first molars is one among those clinical problem which needs urgent attention otherwise leading to the impaction of the first molars and damage to the second primary molars finally leading to early extraction followed by space closure and impaction of the premolars [9]. Before intervention of this condition, proper diagnosis of type of the ectopic eruption is very essential in all cases and this should start at the age of 6 to 7 years (mixed dentition stage) which corresponds to the age of eruption of the mandibular first molars [10]. Ectopic eruption of permanent mandibular first molars has been classified based on its effect on the status of primary second molar and it is elaborated in Table 1 [11]. This condition is also classified into reversible and irreversible type and it is explained in Table 2 [12]. Based on this classification, the present case was classified into 'severe type' (Grade III) as there was evidence of distal root resorption in the primary second molar leading to pulp exposure caused by the ectopic eruption of the both permanent first molars. Based on another type of classification, the present case was diagnosed as Irreversible type/ Hold type' as the permanent first molar remained blocked by the distal aspect of the primary second molar.

**Table 1: Classification of ectopic eruption of permanent first molars based on its effect on the primary second molars [11]**

Grade	Classification	Description
Grade I	Mild	Limited resorption of the cementum/or with minimum dentine penetration
Grade II	Moderate	Resorption of dentine without pulp exposure
Grade III	Severe	Resorption of the distal root leading to pulp exposure
Grade IV	Very severe	Resorption affecting the mesial root of the primary second molar

**Table 2: Classification of ectopic eruption of permanent first molars [12]**

Type	Classification	Description
Type I	Reversible (Jump type)	Self-correcting Permanent molar spontaneously self corrects and erupts in a normal position following the complete resorption of the distal root surface of the second primary molar. Seen in 66% of the cases
Type II	Irreversible (Hold type)	Not self-correcting, requires intervention Permanent molar is blocked by the primary second molar and remains 'locked' Intervention is required to remove the block or get corrected following premature exfoliation of the primary second molars

Proper diagnosis of ectopic eruption of the permanent first molar is very important which includes thorough clinical examination of the involved tooth. On clinical examination, the crown of the offended tooth looks locked behind the distal aspect of the second primary molar and is usually tilted mesially. Clinical examination should be carried out at the age of 5-7 years of child's age using either bitewing or orthopantomograph radiographs. Most of the time, orthopantomograph plays an important role which depicts position of the first permanent molar in relation to the distobuccal root of the second primary molar and mesial inclination of the ectopic tooth. All these features when present suggest the presence of ectopic eruption of the permanent tooth [8-12].

The treatment modality differs in different case scenario based on many factors such as the severity of the ectopic position of the permanent molar, age of the patient, presence of the second premolar, severity of the impaction and the degree of the root resorption of the primary second molars [12]. In case of irreversible type of ectopic molar, the treatment involves the movement of the tooth distally to regain space and the correction of the mesial angulation allows normal eruption of the permanent first molar. In some cases, spontaneous correction will occur and this happens before seven years of age. Various treatment modalities have also been suggested which includes distal tipping, interproximal wedging, and use of removable or fixed appliances to distalize the ectopic molar like brass wire, prefabricated clip separator, Halterman appliance, distal jet, Jones jig, Lip bumper, triangular wedging and elastomeric separator [12-20].

Compared to all tooth developmental abnormalities, tooth agenesis is the most common dental developmental anomaly seen across the world pertaining to human dentition. The most frequently seen missing teeth are premolars and lateral incisors and the number of missing teeth is 1-2 in >80% of cases [6]. Several factors found associated with tooth agenesis like tooth size or shape abnormalities, delayed eruption or ectopic eruption in the permanent dentition and also related to prolonged retention, premature loss, infra-occlusion and dental caries in the primary dentition. One epidemiological study shows that agenesis of second premolars was observed more in the mandible compared to maxilla and observed as absence of one or two second premolars in 75% of the cases out of 176 white European patients

evaluated [7]. The growth and developmental of second premolars in humans shows a non-constant instability like delayed development of the tooth bud during embryogenesis. Song et al [7] recently predicted agenesis of the maxillary second premolar based on the developmental stages of the maxillary first premolar. In their study compared to lateral incisors, premolars develop at a relatively late stage and calcification of the second premolars is radiographically observed at approximately 5 years of age. It is also observed that second premolars which begin to develop extremely late, particularly in the maxilla. Therefore, agenesis of second premolars is typically diagnosed radiographically after 9 years of age. In addition, the diagnosis based on chronologic age is not considered reliable because the development of dentition is reportedly delayed in patients with agenesis compared with that in those without agenesis [6,7]. In 2015, Nirmala et al [10] reported bilateral agenesis of both maxillary and mandibular second premolars in a 17 year old male Indian patient. In this case both maxillary second premolars were congenitally absent along with existence of ectopic eruption of the permanent first molars which is not reported in the dental literature.

The exact etiology behind the second premolar agenesis is not clear. It is speculated that the mechanism for occurrence of congenital agenesis of tooth may be due to the expression or mis-expression of certain genes at certain times in the development of a tooth germ. Sometimes it is also stated that in few cases, the developing tooth germ may be initiated normally, which later may undergo involution of the developing tooth which is caused by abnormal apoptosis [6].

The planning of treatment modality for congenital agenesis of maxillary second premolars is highly challenging. As the primary second molars are usually larger than the permanent second premolar, the treatment usually involves early extraction of primary second molar in order to reduce the edentulous space by spontaneous migration of the permanent first molar [10]. Congenital agenesis of maxillary second premolars when present leads to numerous clinical problems. Hence proper planning should be initiated at appropriate time to manage the edentulous space after the exfoliation of the primary second molars. Before planning treatment guidelines, different factors should be carefully evaluated. Various treatment options like conventional bridges or resin bonded bridges to fill the edentulous space or a full coverage conventional bridge in young patients has been suggested [8-10]. The later treatment option may cause devitalization of the pulp and require root canal therapy. If primary second molar is present it is advised to wait for its exfoliation and this should be maintained in the arch by restoring it. Following its exfoliation, and considering age of the child, implant supported prosthesis can be planned. Before placing an implant, the vertical growth of face in children should be noted and this can be evaluated by serial cephalometric radiographs to assess the growth of ramus which in turn determines the vertical growth of the face [6,7]. In females the vertical growth of the face stops at 17 years of age and in males it ceases at 21 years of age. Another treatment option is the closure of the space by orthodontic treatment when second primary molars are exfoliated which includes either distal movement of first premolar or mesial movement of first molars into the existing space [10]. This is the better option in treating the cases of congenital agenesis of second premolars. When this is not possible the edentulous space can be maintained using space maintainers till the placement of permanent prosthesis such as implant supported crown or bridge. In the case described here, all the possible treatment options were explained to the patient. Unfortunately, patient did not show positive attitude for these dental problems.

## CONCLUSION

Thorough clinical examination of each patient is utmost important in order to diagnose the asymptomatic dental anomalies which may remain undiagnosed from oral examination. Therefore, detailed knowledge about occurrence of ectopic eruption of permanent first molars and congenital agenesis of tooth structures is very essential among all dentists to provide proper treatment and also to avoid unwanted clinical consequences.

## REFERENCES

1. Rajashekhar R, Sharada J, Suhasini K, Hemachandrika I, Shaik H, Singh PT. Occurrence of ectopic eruption of different classes of teeth in growing children – A prospective study. *Indian J Orthod Dentofacial Res* 2019; 5(3): 96-7.
2. Sultan S, Telgi CR, Chaudhary S, Manuja N, Sinha AA. Management of an ectopically erupted permanent mandibular first molar: A review and case report. *J Interdiscip Dentistry* 2021; 11: 78-83.
3. Hennessy J, Al-Awadhi EA, Dwyer LO, Leith R. Ectopic eruption of first permanent molar teeth. *Dent Update* 2012; 39: 656-661.
4. Kirtaniya BC, Tiwari S, Prakash S, Murmu S, Kumar S. "Ectopic eruption of teeth and their management in Children: Literature review and Case reports". *EC Dent Sci* 2018; 17(4): 409-18.
5. Chapman H. First upper permanent molar partially impacted against second deciduous molar. *Int J Ortho Oral Surg Radio* 1923; 9: 339-45.
6. Cardoso MA, Paranhos LR, Siqueira DF, Guedes FP. Agenesis of maxillary second premolar-diagnosis and clinical management. *Int J Orthod (Milwaukee, Wis)* 2015; 26(1): 53-58.

7. Song JS, Shin TJ, Kim YJ, Kim JW, Jang KT, Lee SH et al. Prediction of agenesis of the maxillary second premolar based on the developmental stages of the maxillary canine, first premolar, and second molar. *Archives of Oral Biology* 2020; 111, March, 104629.
8. Park MK, Sin MK, Kim SO, Lee HS, Lee JH, Jung HS, et al. Prevalence of delayed tooth development and its relation to tooth agenesis in Korean children. *Archives of Oral Biology* 2017; 73; 243-247.
9. Cuoghi OA, De Mendonca MR, Micheletti KR, Miranda-Zamalloa YM, Dias LS. Progressive slicing of second deciduous molars in a young patient with second –premolars agenesis. *J Clin Orthod.* 2014; 48(7): 415-421.
10. Nirmala SVSG, Tharay N, Kolli NKR, Dasaraju RK, Tirupathi SP. Agenesis of second premolars in maxilla and mandible – A rare case report. *Journal of Biomedical Sciences.* 2015; 2(2): 12-16.
11. Barberia-Leache E, Cruz Suarez-Clua M, Saavedra-Ontiveros D. Ectopic eruption of the maxillary first permanent molar: Characteristics and occurrence in growing children. *Angle Orthod* 2005; 75(4): 610-615.
12. Mooney GC, Morgan AG, Rodd HD, North S. Ectopic eruption of first permanent molars: presenting features and associations. *Eur Arch Paediatr Dent* 2007; 8(3): 153-157.
13. Bjerklind K. Ectopic eruption of the maxillary first permanent molar. An epidemiological, familial, etiological and longitudinal clinical study. *Swed Dent J (Suppl)* 1994; 100: 1-16.
14. Kupietzky A. Correction of ectopic eruption of permanent molars utilizing the brass wire technique. *Pediatr Dent* 2000; 22(5): 408-412.
15. Hirayama K, Chow MH. Correcting ectopic first permanent molars with metal or elastic separators. *Pediatr Dent* 1992; 14: 342-44.
16. Harrison LM Jr, Michal BC. Treatment of ectopically erupting permanent molars. *Dent Clin North Am* 1984; 28: 57-67.
17. Kennedy DB. Management of an ectopically erupting permanent mandibular molar: A case report. *Pediatr Dent* 2008; 30: 63-5.
18. Thakur S, Thakur NS, Gupta S. Innovative chair-side technique for the correction of ectopically erupting permanent first molar. *Dent Hypotheses* 2012; 3: 115-7.
19. Halterman CW. A simple technique for the treatment of ectopically erupting permanent first molars. *J Am Dent Assoc* 1982; 105: 1031-3.
20. Nagaveni NB, Radhika NB. Interceptive orthodontic correction of ectopically erupting permanent maxillary first molar. A case report. *Virtual J Orthod* 2010; 8(4): 1-13.

#### CITATION

Nagaveni NB. (2023). Bilateral agenesis of maxillary second premolars and bilateral ectopic eruption of mandibular first molars – A rare case report. *Global Journal of Research in Dental Sciences*, 3(5), 16–20.  
<https://doi.org/10.5281/zenodo.10067075>