

## DEEPLY IMPACTED PRIMARY SECOND MOLAR WITH AGENESIS OF THE SUCCEEDING PREMOLAR: A RARE CASE

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### Abstract

Tooth impaction is seen relatively commonly in the permanent dentition with the most frequently involved teeth being the third molars and canines. Impaction of primary teeth, particularly primary type of impaction, is considered a rare event. This report focuses on impaction of mandibular right second primary molar and absence of mandibular permanent second premolar with dens invaginatus in maxillary incisors in a 11 year old girl.

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### Introduction

Tooth impaction is seen relatively commonly in the permanent dentition with the most frequently involved teeth being the third molars and canines. The impaction in the primary dentition may be divided as primary or secondary. The tooth has never erupted in the former case (also called primary failure of eruption) while it is erupted but then reimpacted in the latter case. Impaction of primary teeth, particularly primary impaction, is considered a rare event but when it does occur, the first and second primary molars are usually affected.

Eruption failure present in different forms from mild to severe.<sup>1</sup> Most of the literature focuses on the infra-occlusion, also known as submergence.<sup>2</sup> Infra-occlusion, by definition, is a position of the teeth which failed to erupt sufficiently to reach the occlusal plane. It usually

represents a secondary impaction and should be distinguished from a genuine impaction. Total impaction of a primary tooth where the tooth is buried in the alveolar bone, is a rare phenomenon with very few cases reported in the literature.<sup>3-5</sup>

Although the etiology of tooth impaction is not fully understood, numerous factors have been suggested including, defects in the periodontal membrane, ankylosis, malposition of the tooth bud, trauma, lack of space for eruption due to precocious eruption of the first permanent molar, odontomas or other types of odontogenic tumors causing obstruction to the eruption pathway, deficient eruptive force, idiopathic developmental disturbances, agenesis of the successor tooth and inheritance.<sup>6,7</sup>

The reported rates of prevalence of agenesis of one or more permanent teeth vary from 2.6% to 11.3%.<sup>8</sup> Excluding third molars, mandibular second premolars, followed by maxillary second premolars and maxillary laterals were the most frequently recorded absent teeth in Caucasian studies.<sup>8,9</sup> An association of tooth agenesis with other dental anomalies has been reported.<sup>9,10</sup> Also, a reciprocal association between infraocclusion of the primary molars and aplasia of the premolars was found.<sup>11,12</sup> In this case report, we presented a rare case of a totally impacted primary second molar and agenesis of the successor second premolar together with dens invaginatus in maxillary incisors.

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## CASE REPORT

An 11 year old girl referred to the clinics of Pediatric Dentistry for the evaluation of the missing mandibular right second premolar. She signed an informed consent form before clinical and radiographical examinations. The patient was symptom-free. On intraoral examination, the absence of the mandibular right second premolar and mandibular left lateral incisor was noted. Apart from the missing teeth, she had full permanent dentition. Some degree of spontaneous space closure has been established by mesial drift of the first molar and distal drift of the first premolar (Fig 1). She had a class II dental and skeletal relationship. No abnormal signs in gingiva, buccal tissue and alveolar bone of the right mandible were observed.



**Fig 1.** Intraoral appearance of right mandibular region

Panoramic radiograph revealed that mandibular right second primary molar was impacted and the mandibular permanent second premolar was absent. The impacted tooth had well developed crown and one third of the roots were developed with no sign of resorption. No evidence of odontoma or any other pathologies could be observed but a widened capsule surrounding the crown was noted. The impacted tooth was very near the lower border of the mandible the roots leaning on the cortical bone and the crown was located between the roots of the permanent first premolar and first molar (Fig 2).

Medical history was irrelevant except hypersensitivity to cephalosporins. The family's medical history was noncontributory. The parents recalled no trauma or infection to the oral and

maxillofacial region. It was also reported that the mandibular second premolar has never erupted.



**Fig 2.** Panoramic radiograph of patient.

The patient was enrolled for an orthodontic therapy. Due to the fact that the impacted tooth was an obstacle to the orthodontic tooth movement and was surrounded by a widened capsule, it was removed surgically. The possible surgical risks were pathologic fracture of the mandible and injury to the inferior alveolar nerve. However on the follow up, the patient was well with no complaints.

Also, maxillary central incisors had dens invaginatus type I and lateral incisors had dens invaginatus type II, as classification system first proposed by Oehlers<sup>13</sup>. The lateral incisors were restored with a flowable resin material.

## DISCUSSION

Here, we presented a rare case of total impaction and transposition of the primary molar in association with agenesis of the succeeding permanent premolar. Eruption failure of the primary tooth may be related to the absence of its successor. Otsuka et al.<sup>14</sup> presented a series of 14 unerupted primary teeth, three of which had no identifiable permanent successor. Antoniadis et al.<sup>15</sup> reported that half of the 28 submerged teeth had congenital absence of the successor buds.

It is difficult to know whether agenesis of the permanent tooth hamper the eruption of its predecessor or eruption failure of the primary tooth impair the development of its successor. There are cases of which primary molars erupt without the successor tooth germ and impacted primary molars with reasonably well developed successors, or even, permanent successor having a position occlusal to the unerupted primary tooth.<sup>1</sup>

In a study describing primary failure of

eruption of fourteen second primary molars, the unerupted teeth suggested to prevent the development of the corresponding premolars<sup>16</sup>. Hayashi-Sakai et al.<sup>17</sup> presented their case with a failure of primary first molar eruption and radiologically absent successor germ. Successful eruption was achieved by removal of the thick layer of soft tissue and bone covering the tooth and application of traction. However, up to the age of five year and 9 months, no evidence of permanent tooth germ was noted. Although the retarded development of the permanent tooth is probable, anticipated development failure of this tooth may imply that the absence of the permanent tooth germ may hamper the natural eruption forces on the predecessor primary tooth. Successional permanent tooth germs originate from further epithelial proliferation of dental lamina where it joins the dental organ of the predecessor deciduous teeth germ. Primary teeth start to form between the sixth and eighth weeks in utero, and permanent teeth begin to form in between the twentieth week in utero and tenth month after birth. Mandibular second premolar initiates its calcification at the two and a half year, by this time the primary second molar nearly complete its formation and gradually erupt. Through the prerule movements, the permanent tooth shifts their place considerably as the jaws develop. Premolar tooth germs finally positions between the roots of the primary molars. These prerule movements guide the eruption of the primary tooth.

Total bony impaction of the primary molars is rarely encountered. During the eruption process, through bone resorption and apposition, the tooth buds ascent towards the alveolar crest. In our case, deep impaction and transposition of the primary molar towards the lower border of the mandible could be explained by the fact that while the primary molar failed to ascent, alveolar bone carried upwards with the erupting permanent teeth on either side and carried towards the space allocated for the permanent second premolar by mesial drifting of the permanent first molar and distal drifting of the premolar.

Eruption failure and agenesis of teeth can be attributed to various environmental, pathologic and genetic factors. No local factors appear to be responsible for the failure of eruption of the primary molar presented in this report. However, the related agenesis of the permanent premolar

and agenesis of the lateral incisor may imply a genetic factor. In accordance, Zengin et al.<sup>18</sup> reported a case of monozygotic twin brothers both of which had four impacted primary molars and associated agenesis of the succeeding premolars. In a sample of 203 patients with agenesis of second molars, the prevalence of agenesis of other permanent teeth was significantly higher. In addition, significant increase in occurrence of other dental anomalies was found<sup>10</sup>. The authors concluded that agenesis of the other permanent teeth together with dental anomalies may share the same genetic mechanisms that cause second premolar agenesis. Besides inheritance, dental agenesis may also appear as a sporadic condition. In a study, out of 17 patients with dental agenesis, 9 had families with dental agenesis and 6 had families with no dental agenesis<sup>19</sup>.

Dens invaginatus could be related with various syndromes as Williams, Nance-Horan and Ekman-Westborg-Julin based on genetic disorders, but it was mostly encountered with hypodontia and dens invaginatus and evaginatus<sup>20,21</sup>. It has been proposed that the dental abnormalities such as dens invaginatus, dens evaginatus and agenesis occurred because of the degeneration or hyperactivity of dental lamina<sup>20,22</sup>.

## CONCLUSIONS

Proper observation of unerupted teeth are very important in patients with impacted teeth. Absence of permanent teeth and presence of dens invaginatus could be related to impacted primary teeth.

## References

1. Kjaer I, Fink-Jensen M, Andreasen JO. Classification and sequelae of arrested eruption of primary molars. *Int J Paediatr Dent* 2008; 18(1): 11-17.
2. Kırzioğlu Z, Karayılmaz H, Baykal B. Value of Computed Tomography (CT) in Imaging the Morbidity of Submerged Molars: A Case Report *Eur J Dent* 2007; 1(4): 246-250.
3. Gündüz K, Muğlali M, Inal S. Total impaction of deciduous maxillary molars: two case reports. *J Contemp Dent Pract* 2007; 8(6): 64-71.
4. Antoniadis K, Tsodoulos S, Karakasis D. Totally submerged deciduous maxillary molars. Case reports. *Aust Dent J* 1993; 38(6): 436-438.
5. Inoue K, Inui M, Nakamura S, Yanase S, Yamada M, Tagawa T. Two cases of totally submerging buried primary molars: characterization of clinical behavior and discussion of cause. *J Clin Pediatr Dent* 2001; 25(2): 127-130.
6. Walker LM, Wood AJ, McDonald A, Carpenter W. Unerupted mandibular second primary molar with an unusual histopathological finding: a case report. *J Dent Child* 2004; 71(1): 77-79.

7. Shapira Y, Finkelstein T, Shpack N, Lai YH, Kuflinec MM, Vardimon A. Mandibular second molar impaction. Part I: Genetic traits and characteristics. *Am J Orthod Dentofacial Orthop* 2011; 140(1): 32-37.
8. Larmour CJ, Mossey PA, Thind BS, Forgie AH, Stirrups DR. Hypodontia--a retrospective review of prevalence and etiology. Part I. *Quintessence Int* 2005; 36(4): 263-270.
9. Kırzioğlu Z, Kösel Şentut T, Özay Ertürk MS, Karayılmaz H. Clinical Features of Hypodontia and Associated Dental Anomalies; A retrospective study. *Oral Disease* 2005; 11(6): 399-405.
10. Garib DG, Peck S, Gomes SC. Increased occurrence of dental anomalies associated with second-premolar agenesis. *Angle Orthod* 2009; 79(3):436-441.
11. Bjerklin K, Kurol J, Valentin J. Ectopic eruption of maxillary first permanent molars and association with other tooth and developmental disturbances. *Eur J Orthod* 1992; 14(5): 369-375.
12. Kırzioğlu Z, Ulu KG. Süt Molarlarda İnfraoklüzyon. *Akademik Dental Dişhekimliği Dergisi* 2006; 8(3): 61-65. (In Turkish)
13. Oehlers FA () Dens invaginatus. I. Variations of the invaginated process and associated anterior crown forms. *Oral Surg Oral Med Oral Pathol* 1957; 10: 1204-1218.
14. Otsuka Y, Mitomi T, Tomizawa M, Noda T. A review of clinical features in 13 cases of impacted primary teeth. *Int J Paediatr Dent* 2001; 11: 57-63.
15. Antoniadis K, Kavadia S, Milioti K, Antoniadis V, Markovitsi E. Submerged teeth. *J Clin Pediatr Dent* 2002; 26(3): 239-242.
16. Rasmussen P, Kotsaki A. Inherited primary failure of eruption in the primary dentition: report of five cases. *ASDC J Dent Child* 1997; 64(1):4 3-7.
17. Hayashi-Sakai S, Taguchi Y, Tadashi N. Failure of tooth eruption involving a mandibular primary first molar: a case report. *J Dent Child* 2005; 72(1): 16-20.
18. Zengin AZ, Sumer AP, Karaarslan E. Impacted primary tooth and tooth agenesis: a case report of monozygotic twins. *Eur J Dent* 2008; 2(4): 299-302.
19. Galluccio G, Pilotto A. Genetics of dental agenesis: anterior and posterior area of the arch. *Eur Arch Paediatr Dent* 2008; 9(1): 41-45.
20. Kırzioğlu Z, Ceyhan D. The prevalence of anterior teeth with dens invaginatus in the western Mediterranean region of Turkey. *Int Endod J* 2009; 42(8): 727-734.
21. Gündüz K, Çelenk P, Canger EM, Zengin Z, Sümer P. A retrospective study of the prevalence and characteristics of dens invaginatus in a sample of the Turkish population. *Med Oral Patol Oral Cir Bucal* 2013; 18(1): 27-32.
22. Tavano SM, de Sousa SM, Bramante CM. Dens invaginatus in first mandibular premolar. *Endod Dent Traumatol* 1994; 10: 27-29.