



Non-Syndromic Impacted Primary Molar with Eruption Disturbance in Premolars: A Case Report of an Unusual Occurrence

Amina Sultan^{1-a}, Akanksha Juneja^{1-b*}, Muzna Zaman^{2-c}

¹ Dept of Pediatric and Preventive Dentistry, Faculty of Dentistry, Jamia Millia Islamia, New Delhi, India.

² Intern, Faculty of Dentistry, Jamia Millia Islamia, New Delhi, India.

*Corresponding author

Case Report

History

Received: 30/12/2023
Accepted: 21/05/2024

License



This work is licensed under
Creative Commons Attribution
4.0 International License

ABSTRACT

Tooth impaction is a commonly observed dental anomaly frequently discussed in the dental literature. Overall, the prevalence of impacted teeth in deciduous dentition ranges between 1.3% to 8.9%, with siblings experiencing a noticeably greater incidence. Based on the data, the most impacted primary teeth seen in children are second deciduous molars, followed by primary central incisors. Impaction of primary teeth may be associated with disturbance in their permanent successors, so long-term observation is necessary until the permanent successors erupt. Therefore, the present case report aims to describe a rare and unusual eruption disturbance of premolars in a pediatric patient caused by impaction of the primary molar.

Keywords : Ankylosis, Eruption Failure, Impaction, Primary Molar, Transposition

a asultan@jmi.ac.in
c muznazaman2000@gmail.com

<https://orcid.org/0000-0001-5245-4416> b ajuneja@jmi.ac.in
 <https://orcid.org/0009-0005-2077-4075>

<https://orcid.org/0000-0003-4127-1133>

How to Cite: Sultan A, Juneja A, Zaman M. (2024) Non-Syndromic Impacted Primary Molar with Eruption Disturbance in Premolars: A Case Report of an Unusual Occurrence, *Cumhuriyet Dental Journal*, 27(2): 142-146.

Introduction

Tooth impaction is a commonly observed dental anomaly frequently discussed in the dental literature.¹ A tooth is considered "impacted" when it remains unerupted more than one year after the usual age for its eruption.² The occurrence of impacted permanent teeth varies according to the population and ranges between 6.9 and 76.6%.¹ The most frequently impacted teeth are the third molars (16.7% to 68.6%)³, followed by maxillary canines (0.8 – 3.6%)¹ and premolars.^{1,3} It has been documented that the incidence of impacted premolars varies with age. According to reports, the prevalence in adults is 0.5%; the range for maxillary premolars is between 0.1-0.3%, and mandibular premolars is between 0.2-0.3%.^{4,5} Also, the impaction of maxillary premolars and canines is seen more often palatal, while the incidence of mandibular premolars impaction is predominantly lingual.⁶ Overall, the prevalence of impacted teeth in deciduous dentition ranges between 1.3% to 8.9%, with siblings experiencing a noticeably greater incidence.^{7,8} Based on the data, the most impacted primary teeth seen in children are second deciduous molars, followed by primary central incisors.⁹ Also, primary mandibular molars tend to be impacted more than ten times as frequently as primary maxillary molars. Further, total impaction, on the contrary, is a highly uncommon

phenomenon, and only a few cases have been documented in the literature.⁸

The impaction can be categorised as either primary, when the tooth has not yet erupted (also known as the primary failure of eruption) or secondary, meaning the tooth becomes re-impacted after eruption following various reasons.^{10,11} Primary failure of eruption is confirmed if the mucosa around the unerupted tooth is firm and radiographically, the tooth appears to be deeply embedded in the jaw bone.¹¹ When the permanent tooth fails to erupt because of a retained primary tooth, an odontoma, a cystic lesion, or an extra tooth, this is diagnosed as a secondary failure of eruption.⁸

An impacted tooth is usually associated with several systemic prenatal and postnatal disorders, diseases, and syndromes. Various factors can lead to impaction of a deciduous tooth, including trauma, malposition, dilacerations, ankylosis, injuries of the periodontal ligament, congenitally missing permanent teeth^{8,11-14} local disturbances in the periodontal membrane of the RANK (receptor activator of nuclear factor kappa-B) / RANKL (RANK ligand)/OPG (osteoprotegerin) system¹⁵, premature eruption of the first permanent molar, inadequate eruptive forces, cleidocranial dysostosis and hypopituitarism⁸ or a combination of these factors. In certain situations, environmental or familial factors may also be involved.¹⁵ Unerupted deciduous molars can result in a couple of complications in the oral cavity

including space loss in the dental arches, tipping of adjoining teeth and supra eruption of the antagonist. Further, the unerupted primary molars also affect the development of the corresponding premolars and may prevent their movement to their functional position in the oral cavity.^{10,14,15}

Whenever an impacted tooth is suspected, a thorough radiographic evaluation of the region should be performed, along with a clinical examination. Usually, an Orthopantomogram (OPG) along with an occlusal radiograph is essential. However, full three-dimensional (3D) details of all the components in the oral cavity cannot be seen clearly in these radiographs, mainly due to the overlapping anatomical structures.¹⁶ The palatally impacted premolars may not always be seen on a standard Intra oral periapical (IOPA) radiograph because they are occasionally located horizontally relatively high in the palatal vault close to the nasal and sinus floor.⁴ Therefore, a precise and correct diagnosis is vital for proper treatment. Cone-beam computed tomography (CBCT) is beneficial in locating the impacted teeth precisely and is often utilized as an alternative or along with conventional techniques.¹⁷

In comparison to permanent teeth, impaction and eruption failure in primary teeth are uncommon, and very few cases have been reported in the dental literature.^{7,14}

This report presents a case of an impacted primary maxillary first molar, including bilateral impaction of maxillary premolars in a nine-year-old girl. This paper also highlights the significance of proper and timely diagnosis and treatment planning to avoid undesirable complications following the impaction of teeth.

Case Report

A nine-year-old girl, was referred to the Out Patient Department (OPD) of the Department of Paediatric & Preventive Dentistry of the dental college with the chief complaint of pain in 64. On intra-oral examination, the patient's occlusion was in the mixed dentition stage, with

carious maxillary left first primary molar. Also, both the right maxillary molars (54 & 55) were clinically missing resulting in mesial tipping of the crown of the maxillary right first permanent molar. There was no evidence of soft tissue swelling or discolouration of the surrounding dentition. (Figure 1) The panoramic radiograph established the impaction of 54, along with 14, and 15, and also confirmed the congenital absence of 55 and 45. The radiograph displayed the distoangular impaction of 14 which was positioned mesial and slightly above the level of 54, while 15 was vertically impacted, and appeared to be placed distal to 54. No significant resorption was evident in the roots of impacted right primary maxillary molar. Impacted 14 and 15 showed developing roots. There was absence of any circumscribed radiolucency around the impacted premolars. The radiograph further revealed horizontally angulated 24 and transposition of 23. (Figure 2) A CBCT scan was advised for the precise diagnosis. The 3D images of the maxilla and mandible corroborated impaction of 14, which appeared to be near the nasal floor, impaction of 15, superiorly positioned 23 in the alveolus in buccal relation to 64, mesioangular impaction of 24 in close approximation to the palatal cortex. The images also showed the rotation of 25 on its axis. (Figure 3) Any anomalous growth/calcium deposits were also not seen. The patient did not reveal signs and symptoms of any syndrome and gave no history of infection or dental trauma. Clinical examination of parents did not reveal any genetic predisposition to the condition.

The patient's chief complaint (proximal caries) was managed and the carious left maxillary primary first molar was restored with Glass Ionomer Cement. We will follow a multidisciplinary approach to manage the dental implications. The space observed in the dental arch was insufficient for the eruption of impacted maxillary primary molar. Space regaining followed by surgical extraction of 54 and extrusion of 14 and 15 has been planned in collaboration with the Orthodontic and Oral Surgery department. At present, restorative and space regaining procedure has started.



Figure 1: Intraoral picture of maxillary and mandibular arch.



Figure 2: OPG showing impacted 54, 14,15, transposition of 23, mesioangular impaction of 24 and missing 45.

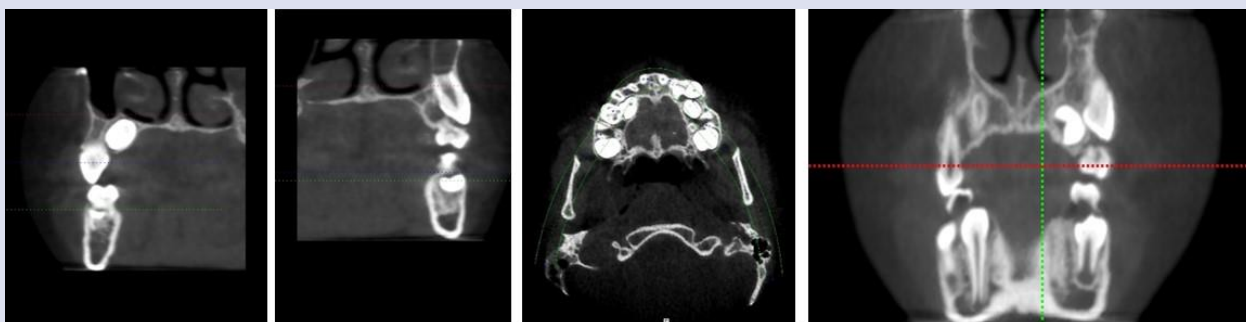


Figure 3: CBCT images showing impacted teeth.

Discussion

An impacted tooth refers to one that is either locked in place by bone or the tooth(s) or fibrous tissue next to it; or one that has become stuck in the alveolus that obstructs its normal functional eruption.¹⁸ In our patient, the most significant observation was the impaction of the right maxillary primary first molar, while the contralateral maxillary primary molar was clinically present. Also the right maxillary second molar was congenitally missing. Only 2.5% to 8.3% of children have been reported to have primary molar impaction. These observations are comparatively uncommon.¹⁹

In our patient, there was no applicable familial or health history. The factors responsible for primary tooth impaction can be systemic and local. The local aetiology of an impacted primary tooth can be divided into two groups.²⁰ One is the impacted primary tooth itself,¹⁰ whereas other causes include mechanical blocking due to deformity in tooth germ, shift in tooth position, traumatic injury, ankylosis, gingival hyperplasia, and lack of space for tooth eruption¹⁴ along with certain dental anomalies like eruption cyst, odontogenic tumours and odontomas.^{14,20}

Most documented reports of impacted primary teeth in the literature have been shown to result from odontomas.^{14,19} Besides there have been reports of an impacted primary tooth with an unknown cause.¹⁴

The cause of impacted 54 in this case could be malpositioned tooth germ of premolar there is evidence in literature when a permanent successor had interfered with the eruption of a primary molar into a normal occlusion.^{21,22}

Based on the embryological findings, the tooth buds of premolars develop in the palatal area of the maxillary arch and in the lingual part of the mandibular arch in relation to the enamel organ of the deciduous dentition. Normally, the tooth buds of premolars are positioned near the occlusal surface of the primary molars, which change their position moving toward the roots of the primary molars.^{15,19} In the present case the maxillary right first premolar (14) may have developed in a superior and lateral position with respected crown of the impacted maxillary right primary first molar (54). And this phenomenon leading to the non-eruption of primary molar usually occurs before the age of three years when the permanent tooth bud in the initial stage is located

laterally to the arrested primary molar as reported by Kjaer *et al.*¹⁵

The impacted primary molar in this case did not show ankylosis. Some previous reports have suggested ankyloses can lead to an impacted primary molar, and anticipated that an ankylosed unerupted deciduous molar will become more deeply embedded in the alveolar bone during growth of the jaws. Also, the analysis of the characteristics of the impactions in primary teeth in the literature, suggests that ankylosis is probably a leading role in etiopathogenesis of impaction.^{14,23-25}

Impaction of primary teeth may be associated with disturbance in their permanent successors, so long-term observation is needed until the permanent successors erupt.¹⁹ Even though the impacted teeth are asymptomatic, some can result in issues such as pain, infection, cysts, tumours, resorption of the adjacent tooth and marginal bone close to the impacted teeth, jaw fractures and mal-positioning of the mandibular incisors.^{1,2} Impacted teeth are often associated with pericoronitis, periodontitis, cystic lesions, neoplasm, root resorption and can cause detrimental effects on the adjacent tooth.²⁶ Due to impacted primary molars, the premolars can be positioned abnormally in the jaw bones. However, the reason for this is not yet clearly understood. It is presumed that if there is no abnormality, the premolar reaches the furcation area of the primary molar, however, they may not move and develop near/on the occlusal plane of the primary molar for whatever reason.^{21,22}

In our case there was also radiographic evidence of horizontally angulated 24 and transposition of 23. The incidence of maxillary canine-premolar transposition is reported to be 0.135-0.510% and is genetically influenced. Majority of maxillary transpositions are unilateral with a higher involvement seen on the left side. Most transpositions are of canine-lateral incisor and are associated with other dental anomalies.²⁵

Treatment options can be considered in cases where impacted premolars have enough space to erupt, like periodic observation; extraction of the primary tooth and monitoring of the permanent tooth; surgical exposure and exteriorization, with or without orthodontic traction; surgical repositioning (auto-transplantation) etc. In other cases, surgical extraction of impacted premolar can be considered. In some cases, spontaneous eruption of impacted tooth might occur after surgical exposure, however, orthodontic alignment may be required.^{5,27}

Impaction of primary teeth might be seen infrequently but can result in several complications. Paediatric dentists should be aware of these complications and diagnose these clinical abnormalities accurately. Also, by timely addressing them, they should prevent any disruptions to the eruption pattern in the permanent dentition.

Conclusions

The diagnosis, planning, and treatment of impacted primary teeth must consider the clinical consequences since failure to do so could result in the displacement of the succeeding permanent tooth, which might interfere with the growth of the permanent dental arch.

References

1. Chu FC, Li TK, Lui VK, Newsome PR, Chow RL, Cheung LK. Prevalence of impacted teeth and associated pathologies--a radiographic study of the Hong Kong Chinese population. *Hong Kong Med J.* 2003;9(3):158-163.
2. Kamiloglu B, Kelahmet U. Prevalence of impacted and transmigrated canine teeth in a Cypriote orthodontic population in the Northern Cyprus area. *BMC Res Notes.* 2014;7:346.
3. Quek SL, Tay CK, Tay KH, Toh SL, Lim KC. Pattern of third molar impaction in a Singapore Chinese population: a retrospective radiographic survey. *Int J Oral Maxillofac Surg.* 2003;32(5):548-552.
4. Oikarinen VJ, Julku M. Impacted premolars. An analysis of 10 000 orthopantomograms. *Proc Finn Dent Soc.* 1974;70(3):95-98.
5. Lee PP. Impacted premolars. *Dent Update.* 2005;32(3):152-157.
6. Andreasen JO. The impacted premolar. In: Andreasen JO, Petersen JK, Laskin DM, eds. *Textbook and Color Atlas of Tooth Impactions: Diagnosis Treatment and prevention.* Copenhagen, Denmark: Munksgaard; 1997:117-195.
7. Dewhurst SN, Harris JC, Bedi R. Infraocclusion of primary molars in monozygotic twins: Report of two cases. *Int J Paediatr Dent.* 1997; 7:25-30.
8. Hashim HA, Al-Qahtani AA, Taha SM, Tharupeedikayil S, Ahmed MF. Management of complete impacted maxillary second deciduous molar with the aid of cone-beam computed tomography: Case report and a review of the literature. *J Orthod Sci.* 2013 Oct;2(4):130-135.
9. Noda T, Takagi M, Hayashi-Sakai S, Taguchi Y. Eruption disturbances in Japanese children and adolescents. *Pediatr Dent.* 2006;16(1):50-56.
10. Rasmussen P, Kotsaki A. Inherited primary failure of eruption in the primary dentition: report of five cases. *ASDC J Dent Child.* 1997;64(1):43-47.
11. Winter GB, Gelbier MJ, Goodman JR. Severe Infra-occlusion and failed eruption of deciduous molars associated with eruptive and developmental disturbances in the permanent dentition: A report of 28 selected cases. *Br J Orthod.* 1997;24:149-157.
12. Gündüz K, Muğlali M, Inal S. Total impaction of deciduous maxillary molars: two case reports. *J Contemp Dent Pract.* 2007;8(6):64-71.
13. Ishihara Y, Kamioka H, Takano-Yamamoto T, Yamashiro T. Patient with nonsyndromic bilateral and multiple impacted teeth and dentigerous cysts. *Am J Orthod Dentofacial Orthop.* 2012;141(2):228-241.
14. Ostuka 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. 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.
16. Haney E, Gansky SA, Lee JS, et al. Comparative analysis of traditional radiographs and cone-beam computed tomography volumetric images in the diagnosis and treatment planning of maxillary impacted canines. *Am J Orthod Dentofacial Orthop.* 2010;137(5):590-597.
17. Quereshy FA, Savell TA, Palomo JM. Applications of cone beam computed tomography in the practice of oral and maxillofacial surgery. *J Oral Maxillofac Surg* 2008;66:791-796.
18. Dorland WAN. *Dorlands' illustrated medical dictionary.* 25th ed. Philadelphia, PA: WB Saunders, 1974:767.
19. Memarpour M, Rahimi M, Bagheri A, Mina K. Unerupted primary molar teeth positioned inferior to the permanent premolar: a case report. *J Dent (Tehran).* 2012;9(1):79-82.
20. Yawaka Y, Shinoguchi K, Makoto Fujii M, Oshima S. Impacted mandibular primary second molar: A case report, *Pediatr Dent.* 2022;32(2):123-128.

- 21.** Okawa R, Nakano K, Nomura R, Fujita, KN, Kamakura, Matsumoto M, et al. Inverted maxillary second primary molar and permanent successor teeth: X-ray photographic evaluations. *Pediatr Dent J*, 19 (2009), pp. 123-129.
- 22.** Borsatto MC, Sant'Anna AT, Niero H, Soares UN, Pardini LC. Unerupted second primary mandibular molar positioned inferior to the second premolar: case report. *Pediatr Dent*. 1999;21(3):205-208.
- 23.** Mishra SK, Jindal MK, Singh RP, Stark TR, Hashmi GS. Submerged and Impacted Primary Molars. *Int J Clin Pediatr Dent*. 2010;3(3):211-213.
- 24.** Bianchi SD, Rocuzzo M. Primary impaction of primary teeth: a review and report of three cases. *J Clin Pediatr Dent*. 1991;15(3):165-168.
- 25.** Tseng YC, Chang HP, Chou TM. Canine transposition. *Kaohsiung J Med Sci*. 2005;21(10):441-447.
- 26.** Hashemipour MA, Tahmasbi-Arashlow M, Fahimi-Hanzaei F. Incidence of impacted mandibular and maxillary third molars: a radiographic study in a Southeast Iran population. *Med Oral Patol Oral Cir Bucal*. 2013;18(1):e140-e145.
- 27.** Kobaiashi VT, Mitomi T, Taguchi Y, Noda T. Occlusal guidance for eruption disturbance of mandibular second premolar: a report of three cases. *J Clin Pediatr Dent*. 2003;27(2):101-105.