

An Interesting Case of Unilateral Multiple Impacted Unerupted Teeth in a Young Adolescent Child: A Case Report and Discussion

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Abstract

Impaction of teeth is a relatively common manifestation that comes across a clinician, however, multiple impacted unerupted teeth are rarely seen and are manifested due to several genetic, systemic, and local factors. In this case report, A 14-year-old male patient presented with unilateral multiple impacted unerupted primary and permanent teeth affecting the left side of the face and also delayed eruption of teeth on the opposite side. The history and relevant clinical findings depicted a picture toward primary failure of eruption (PFE) as provisional diagnosis. This paper also discusses the clinical presentation of the case and various treatment options that can be employed for the management of such a case. The rarity of this case report lies in the fact that although PFE is seen with a common picture of bilateral involvement based on the clinical and radiographic presentation, this case report presented with unilateral involvement of the dentition, a less commonly described variant in the literature.

Keywords: Adolescent, impacted teeth, nonsyndromic, primary failure of eruption, tooth eruption

INTRODUCTION

Tooth eruption is an important milestone in a child's oral development toward adult dentition and invariably occurs uneventfully. However, it comes to notice once impairment of this eruption process occurs. Several factors such as genetic, systemic, and local can impair dental eruption and cause delayed or absent tooth progression among the dental arcade.^[1]

Apart from syndromic conditions such as Down's syndrome, cleidocranial dysostosis, cranial stenosis, and hormonal imbalances (thyroid, parathyroid, or pituitary deficiency), another commonly discussed condition described widely in the literature is the failure of eruption.^[2] This condition has been described in the literature commonly in two types: first, some obstacles hindering the path of eruption of tooth referred to as mechanical failure of eruption, or second, the primary failure of eruption (PFE).^[3]

PFE is a genetic eruption mechanism disorder resulting in partial or complete lack of eruption of teeth.^[2] Proffit and Vig were first to describe this condition,^[4] and the reported prevalence is 0.06% with a 1:2.25 male-to-female sex-ratio.^[5] Genetic modification

presumably has been noticed as a more frequent cause for PFE. Decker *et al.*^[6] were the first to link PTH1R gene mutation to PFE. However, the mechanism by which this mutant gene expresses its phenotype is still largely unknown.

This case report discusses a relatively rare case of unilateral PFE of teeth in an adolescent involving the left side of both upper and lower jaws.

CASE REPORT

A 14 year old male patient was referred from medical college for further evaluation and necessary treatment for multiple

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missing teeth and compromised esthetics. Three years ago, the patient had sought a medical opinion for the same complaint, however, he was reassured for normal eruption of teeth, but following which, still no eruption of teeth had occurred. He had no relevant family history, and this was his first dental visit. The patient's parents also gave a history of unerupted primary teeth and had a unilateral chewing habit due to absent teeth on the left side. On extraoral examination, the patient had an asymmetrical face with slight swelling on the left side of the body of the mandible and angle region. On palpation, the swelling was nontender, hard, and expansile involving the buccal alveolar plate. On intraoral examination, the patient had a mixed dentition with a total of 20 teeth present. The patient had multiple retained, missing, and possibly impacted primary teeth. The details of missing and impacted teeth are given in Table 1. Generalized spacing was seen to be present in anterior dentition with a mandibular shift of 4 mm toward the left side as seen from the midline. Intraoral frontal view also showed canting of mandibular incisor plane toward the left side. Pit-and-fissure carious lesions were present with respect to 16.46 (Fédération Dentaire Internationale notation). He had apparently tapered arch form with high-arched palate [Figure 1]. Hence, a provisional diagnosis of PFE was made. Differential diagnosis for this case was thought to be a dentigerous cyst, keratocystic odontogenic tumor, cleidocranial dysplasia, and facial hemihypertrophy.

Orthopantomogram, posteroanterior (PA) view of the skull and chest was advised to the patient to check for any radiographic abnormalities affecting other skeletal structures of the body. However, On radiographic examination, orthopantomogram revealed delayed but erupting permanent dentition on the right side in both the jaws, whereas complete failure of eruption was seen distal to retained left primary mandibular canine. In addition to this partially developed tooth, germs of primary mandibular molars were also seen to be present. In the left side of the maxillary arch, distal to retained primary canine, maxillary first premolar seemed to be erupting in a distal angulation, with impacted maxillary second premolar and a possibly partially formed impacted primary molar. Partial eruption of maxillary first molar was seen to be present [Figure 2]. On PA view of the skull, left condylar hypertrophy and expansion of buccal cortical plate in the body of the mandible region were seen to be present. However, as such, no cystic findings were evident over the radiographic examination [Figure 3]. The patient did not report for further investigation and was unresponsive. As this case was rare, it has been reported without further investigations.

Table 1: The details of affected teeth based on history and orthopantomogram findings

Impacted teeth (in FDI notation)	Delayed eruption	Retained	Developmentally malformed
23,23,25,27,33,37	14, 15,43,45	53, 63, 73, 85	14, 25, 65, 74, 75

FDI: Fédération Dentaire Internationale

Treatment objective

The primary treatment objective here would be exposure of impacted teeth in lower left quadrant and possible



Figure 1: Preoperative intraoral photographs: (a) Right lateral view showing delayed eruption of permanent teeth and retained primary teeth. (b) Frontal view showing midline shifted toward the left side and canting of occlusal plane. (c) Left lateral view shows unerupted teeth distal to maxillary first premolar and retained mandibular canine, also partially erupted permanent first maxillary molar. (d) Maxillary occlusal view showing partially erupted first premolar on the right side and distally angulated first premolar. Also partially impacted permanent first maxillary molar. (e) Mandibular occlusal view showing retained primary canines and right mandibular molar and depressed alveolar ridge distal to the left primary canine



Figure 2: Orthopantomogram showing delayed eruption of teeth on the right side and multiple impacted teeth in maxillary and mandibular arches in distal segment



Figure 3: Posteroanterior view of skull showing condylar hypertrophy of the left condyle of the mandible

enucleation of malformed primary teeth in the premolar region, and also, the orthodontic treatment plan would necessitate fixed orthodontic therapy in coordination with oral surgery to expose and bond the impacted teeth. The secondary objective includes extraction of 5,36,385 to facilitate the eruption of permanent counterpart, leveling and alignment of teeth, midline correction, and establishing Angle's Class I molar relationship. While this seems to be a conservative treatment option, other more extensive treatment alternatives include extraction of all lower left impacted teeth, and since there is cortical bone expansion, construction of partial denture would be difficult, so using iliac grafts, alveolar ridge construction needs to be done and removable partial denture can be given. Implant-retained prosthesis is another treatment alternative that can be dwelled upon. This treatment alternative remains to be the preferred option as more often in the literature, however, since the patient is still young, orthodontic approach should be the preferred treatment line as it facilitates the patient's natural dentition and saves him from future cost and long-term replacement restorations.

DISCUSSION

PFE is defined as incomplete tooth eruption despite the presence of a clear eruption pathway. PFE affects both the dentitions and may result in either eruption into occlusion and then not erupting further or partial eruption of teeth leading to the stage of just emergence. The most common teeth that get affected are posterior and typically exhibit a pattern, in which all teeth distal to the most mesial affected teeth cease to erupt.^[7] While most eruption defects are part of a genetic syndrome, they can also be nonfamilial, as seen in PFE.^[8]

Cells of dental follicle and surrounding structures contain genes that activate during preeruptive phase and their inability of expression of PTHrP, a ligand, causes the normal developed teeth to be encapsulated by bony crypt and get impacted. The ligand mainly acts by activation of cAMP/PKA pathway. Henceforth, a confirmed mutation test of PTH1R gene and clinical presentation can help in establishing a diagnosis of a case of PFE.^[9]

Frazier-Bowers *et al.*^[3] divided PFE into three types depending on the severity of eruption potential in which Type I included severe lack of eruption potential and in Type II greater but still inadequate eruption potential while the combination of above was referred to as Type III PFE.

Grippaudo *et al.*^[10] in their study extracted DNA from saliva samples of patients who presented with clinical evidence of infraoccluded teeth and mutational analysis of PTH1R gene and concluded that novel mutations were reported in the PTH1R gene that included PFE-affected primary molars and thus substantiates evidence for using genetic diagnostic tools for early diagnosis and intervention.

Management of such disorders has been discussed by Kang *et al.*^[11] and Pithon *et al.*^[12], which include autotransplantation, single tooth segmental osteotomies followed by distraction osteogenesis (DO) and surgical luxation followed by orthodontic extrusion as a successful treatment modality, although, such treatment options have been attributed with reankylosis as a consequent adverse sequale.

Adam *et al.*^[13] in a case report described the use of rare earth magnets for carrying out multiple tooth movements simultaneously in a case of PFE and later used fixed mechanotherapy to achieve favorable results.

Ajith *et al.*^[14] in a case report described the use of Nance palatal arch as an anchorage device for forced eruption of impacted maxillary canine, and later, using fixed mechanotherapy, complete correction of malocclusion was done. Many techniques can be employed to move impacted teeth orthodontically, and some of these include cantilever system, temporary anchorage devices, piggyback archwire mechanism, and auxiliary arm from space maintainers.

Identical to the above study, Patni *et al.*^[15] described in a case report in which multiple supernumerary teeth with multiple impacted teeth were seen. Surgical exposure and extraction of supernumerary teeth followed by fixed mechanotherapy using power threads for very light eruptive force was employed as the preferred treatment option to achieve an esthetic result and correct malocclusion.

Moturi and Kaila^[16] in a case report described a nonsyndromic case of multiple impacted teeth with cystic cavity; a removable complete denture was fabricated as complete anodontia was present. Autogenous bone grafts from the anterior iliac crest were taken post removal of dentigerous cyst. Hence, a similar procedure can be replicated in this case if patients did not opt for fixed mechanotherapy.

Some invasive treatment options include DO or segmental osteotomy; however, their use is still to be validated for routine practice.

CONCLUSION

PFE is thought to be characterized by infraocclusion of posterior teeth affecting especially both sides of the dentition. In addition, primary dentition can also be affected, however, it is less frequently seen. In this particular case, although only one side seems to be affected, genetic test for mutation in PTH1R gene was likely indicated. Regrettably, since the patient was lost to follow-up, further investigation to reach a final diagnosis could not be done. The authors are not able to postulate any metabolic or syndromic pathogenesis for such phenotype. Management of such patients requires multidisciplinary approach, with treatment plan designed highly specific to the clinical presentation.

Declaration of patient consent

The authors certify that they have obtained all appropriate

patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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