

## Failure of Eruption of Permanent Tooth

### Abstract

Primary failure of eruption (PFE) is a rare condition that can lead to posterior open bites. It is difficult to diagnose and difficult to treat. PFE appears to be a condition that predominantly affects the molar dentition. The increased frequency of hypodontia in affected individuals and common findings of a family history regarding tooth eruption problems suggests a significant genetic component to the etiology of this rare condition.

**Keywords:** Eruption failure, primary tooth failure, retained teeth

### Introduction

Tooth eruption has been defined as the movement of a tooth from its site of development within the alveolar process to its functional position in the oral cavity. It is a localized process in the jaws that exhibits precise timing and bilateral symmetry. The dental follicle is necessary for the coordinated resorption and deposition of bone on opposite sides of the erupting tooth during intraosseous tooth eruption. The absence of a tooth in the oral cavity may be the result of some interference with the process of tooth eruption. Most commonly, local factors causing mechanical obstruction to tooth movement into the oral cavity are responsible for the failure of tooth eruption.<sup>[1,2]</sup>

Primary retention is defined as a cessation of tooth eruption before emergence that is not due to a physical barrier in the eruption path, does not result from an abnormal position, and has no systemic cause. A review of the literature suggests that primary retention of permanent teeth is rare, has not been reported in all four quadrants, and has not been associated with abnormalities of the eruption of the primary teeth.<sup>[3-5]</sup> This report describes a female patient with primary retention in the deciduous dentition and the permanent dentition.

### Case Report

A 16 year old female patient appeared for the evaluation and treatment at our clinic

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with a history of retained primary teeth. The patient's medical history revealed that Her mother had an uneventful pregnancy and was delivered at 38 weeks by normal delivery.

A panoramic radiograph revealed the presence of retained primary teeth and development of few permanent teeth. At that time, an extensive evaluation showed no abnormalities in thyroid function, and calcium, phosphorus, and alkaline phosphatase levels were within the normal range for a growing age. Bone age corresponded to chronologic age. The patient has continued to grow normally throughout childhood; for her age, she is above normal in height and weight. The general health of the patient has been excellent, with no allergies or hospitalizations. She has a male sibling with no dental problems, and there is a negative family history of dental anomalies. Physical evaluation revealed her to be a well-proportioned girl with no craniofacial, dermal, or skeletal morphologies. She displayed age-appropriate development, and no abnormalities were noted in her hair, skin, or nails. On initial examination at 16 years of age, it was noted that 16 of her permanent teeth had erupted; these teeth displayed normal size, shape, and quality of enamel; 14 of her primary teeth are retained [Figures 1 and 2]. Radiographically, retained primary teeth were present, and few permanent teeth impacted [Figure 3]. The nonerupted teeth were covered with bone and had well-circumscribed follicles. However,

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Figure 1: Unerupted permanent teeth facial view



Figure 2: Unerupted permanent teeth occlusal view

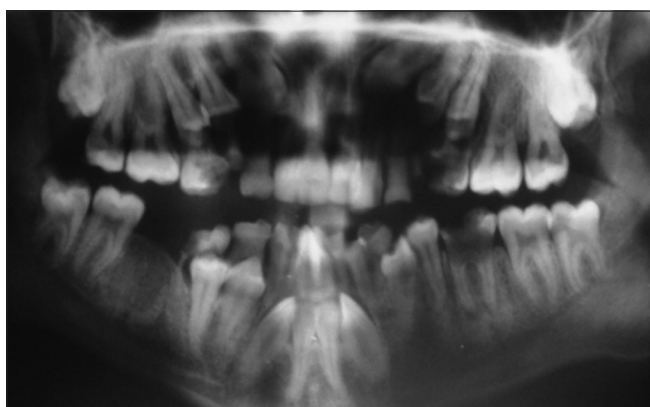


Figure 3: Radiograph showing retained permanent teeth

continued root development of the permanent teeth was noted, without progress toward the alveolar crest.

The patient was evaluated extensively at the initial visit and subsequent visits. All laboratory values were within the normal range, including parathyroid, thyroid, and growth hormone levels and calcium, phosphorus, and vitamin D levels. Bone age at 16 years corresponded to chronologic

age. In the absence of any other signs, the diagnosis was primary retention of the permanent teeth.

## Discussion

This case describes a generalized failure or delay in all tooth types in both the dentition. Delayed eruption is a feature of many diseases and syndromes. The patient was growing at a normal rate, was within normal limits concerning facial and skeletal growth, and was of normal intelligence. No underlying systemic abnormalities have been detected.

Disorders of tooth eruption can be difficult to diagnose given the lack of knowledge about the eruptive process. The diagnosis is based on clinical and radiographic characteristics and sometimes on the response to treatment. The treatment goals are to encourage the teeth to erupt into the oral cavity, usually through surgical exposure.<sup>[6-8]</sup>

Many possible syndromes were eliminated because of a lack of associated signs and the lack of any familial tendency.

Gardner syndrome is another autosomal dominant disorder associated with failure of eruption of the permanent teeth. There was no family history of the disorder, and once again, a defect in eruption of the primary dentition has not been reported in this syndrome.

Ankylosis can occur at any stage during the eruption and can sometimes be diagnosed radiographically by the absence of the periodontal ligament space. The diagnosis is usually based on clinical findings and can be difficult if the teeth have not penetrated the oral mucosa. Ankylosis occurs in the primary and permanent dentitions, most commonly in the primary molar region and in all four quadrants.<sup>[9-11]</sup>

Generalized ankylosis, affecting all tooth types and in both dentitions, has not been reported previously. A diagnosis of primary retention, idiopathic failure of eruption, or embedded teeth is a diagnosis and cannot be separated from ankylosis when there is no eruption of teeth into the oral cavity.

There have been many reports of idiopathic failure of permanent tooth eruption. In each case, there were no abnormalities in the eruption of the deciduous dentition, and only single-tooth types were affected, usually molars. There have been no reports in the literature of generalized primary retention of primary and permanent teeth in the same patient. Primary retention of primary and permanent teeth could be due to a defect in the dental follicle causing disturbed local metabolism and interference with the biological interactions necessary for the eruptive process. Research on mechanisms of tooth eruption has been reviewed by Marks *et al.* They define tooth eruption as a localized, symmetric process of bone resorption and deposition that is dependent on interaction with the dental follicle and is regulated by a number of biological

mediators, such as epidermal growth factor, interleukin, nuclear matrix-intermediate filament, and matrix metalloproteinases. To date, however, the interactions of these mediators have been studied only in animal models. It has also been proposed that each tooth has a “window of opportunity” for successful eruption and that defects during this critical time will cause interference in the eruptive process.<sup>[12-15]</sup>

## Conclusion

This case represents a unique clinical situation and appears to reflect a severe generalized disturbance in the eruptive process, a generalized primary retention, or idiopathic failure of tooth eruption. Evidence from the current literature would suggest that this disorder has a substantial genetic component.<sup>[14-16]</sup>

## 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.

## References

- O'Connell AC, Torske KR. Primary failure of tooth eruption: A unique case. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999;87:714-20.
- Marks SC Jr., Cahill DR. Regional control by the dental follicle of alterations in alveolar bone metabolism during tooth eruption. *J Oral Pathol* 1987;16:164-9.
- Jensen BL, Kreiborg S. Development of the dentition in cleidocranial dysplasia. *J Oral Pathol Med* 1990;19:89-93.
- Becker A, Shteyer A, Bimstein E, Lustmann J. Cleidocranial dysplasia: Part 2 – Treatment protocol for the orthodontic and surgical modality. *Am J Orthod Dentofacial Orthop* 1997;111:173-83.
- Becker A, Lustmann J, Shteyer A. Cleidocranial dysplasia: Part 1 – General principles of the orthodontic and surgical treatment modality. *Am J Orthod Dentofacial Orthop* 1997;111:28-33.
- Brearley LJ, McKibben DH Jr. Ankylosis of primary molar teeth. I. Prevalence and characteristics. *ASDC J Dent Child* 1973;40:54-63.
- Mancini G, Francini E, Vichi M, Tollaro I, Romagnoli P. Primary tooth ankylosis: Report of case with histological analysis. *ASDC J Dent Child* 1995;62:215-9.
- Kaban LB, Needleman HL, Hertzberg J. Idiopathic failure of eruption of permanent molar teeth. *Oral Surg Oral Med Oral Pathol* 1976;42:155-63.
- Proffit WR, Vig KW. Primary failure of eruption: A possible cause of posterior open-bite. *Am J Orthod* 1981;80:173-90.
- Oliver RG, Richmond S, Hunter B. Submerged permanent molars: Four case reports. *Br Dent J* 1986;160:128-30.
- Mellor TK. Six cases of non-eruption of the first adult lower molar tooth. *J Dent* 1981;9:84-8.
- Demirjian A, Goldstein H, Tanner JM. A new system of dental age assessment. *Hum Biol* 1973;45:211-27.
- Lyons LA, Lewis RA, Strong LC, Zuckerbrod S, Ferrell RE. A genetic study of Gardner syndrome and congenital hypertrophy of the retinal pigment epithelium. *Am J Hum Genet* 1988;42:290-6.
- Baker RH, Heinemann MH, Miller HH, DeCosse JJ. Hyperpigmented lesions of the retinal pigment epithelium in familial adenomatous polyposis. *Am J Med Genet* 1988;31:427-35.
- Mitchell DL, West JD. Attempted orthodontic movement in the presence of suspected ankylosis. *Am J Orthod* 1975;68:404-11.
- Pytlík W, Alfter G. Impairment of tooth eruption. Pathogenetic aspects. *J Orofac Orthop* 1996;57:238-45.