

## Tooth Developmental Disorders in Children

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### Abstract

Most babies are born with primary teeth underneath their gums. In general, the process of tooth growth and tooth eruption from the gums in infants begins at about 3 months of age and this process can continue until the age of three. The growth age of primary teeth varies from child to child. In some cases, primary teeth do not develop.

Congenital genetic defects, hormonal disorders, some diseases and malnutrition are considered to be important factors in the lack of tooth development in children.

**Keywords:** Eruption; Tooth Development; Primary Teeth; Congenital Defect; Hormonal Disorders; Malnutrition

### Introduction

Tooth development in children begins at about 4 months. The first tooth eruption is seen between the ages of 4 to 15 months [1]. If these teeth come out before this time, it is considered early growth. But if primary teeth do not grow by 18 months age, they are considered late growth [1]. In most cases, delayed tooth growth is not a concern. Although a variety of factors may cause baby teeth to grow late, there is often no obvious cause and no teeth may grow in a baby's mouth until 18 months of age. Some factors are involved in a late delayed tooth growth of children or tooth developmental disorders including genetic and hormonal factors [2-5], malnutrition [6-8], systemic conditions [2] and diseases such as Bone and Skin diseases [9,10].

### Genetic disorders

Congenital genetic defects can affect the physical development of children and may even affect their appearance, leading to stunted deciduous teeth. In children with Progeria or Down syndrome, some of the primary teeth may never develop. All patients are at least partially dentulous [11].

Progeria or Hutchinson-Gilford progeria syndrome is an extremely rare autosomal genetic disorder that the symptoms resembling aspects of aging are revealed at a very early age [12]. The premature aging disorder is a condition in which a child's body ages much faster than its peers. Those children who are born with Progeria typically may live to mid-teens to the early twenties [12].

In patients with Progeria Syndrome and Downs syndrome, some dental manifestations such as significantly delayed eruption and delayed loss of primary teeth are common [13]. In progeria, dental crowding occurs due to a micrognathia of both maxilla and mandible, lack of primary tooth loss, and secondary irregular tooth eruption; although the secondary tooth eruption is often partial [14-17]. Other dental findings are including, hypodontia, localized areas of enamel hypoplasia [14-17].

Down syndrome, referred to in medical terms as trisomy 21, occurs when a person is born with a specific abnormal cell division results in extra genetic material from chromosome 21 [18]. A genetic mutation in a gene called PAX9 can cause dental problems or even stunted teeth [19], but in this disorder, the patient's deciduous teeth usually develop but permanent teeth may not form at all.

Tooth wear and bruxism are also common in Down's children [20]. Other common oral manifestations of Down syndrome include enlarged tongue, mouth breathing, narrow palate with crowded teeth, class III malocclusion, deficiency of growth of maxilla, posterior crossbite, delayed exfoliation of primary teeth and delayed eruption of permanent teeth, shorter roots on teeth, and often missing and malformed teeth [20-23].

Delayed tooth growth is often genetic, and usually if observed in a family member, one should expect the new child to be genetically predisposed to delayed tooth development unless he or she is the first child. Delayed tooth development can be passed from parents to the child. Thus, if either parent's teeth had grown late in childhood, their children would be expected to experience stunted growth as well.

### Hormonal disorders

Hormonal disorders of the thyroid and parathyroid glands can lead to delayed or stunted growth of both primary and permanent teeth [3-5,24]. These two glands secrete hormones that control the body's various processes, from metabolism to certain levels of nutrients (including sugars, proteins, fats, vitamins, and minerals) in the bloodstream. Hypothyroidism or Hypoparathyroidism are conditions in which these glands do not secrete enough hormones in the patient's body. Having one or both of these disorders can affect the growth of baby teeth.

Children with hypothyroidism may suffer from delayed tooth eruption, enamel hypoplasia, micrognathia, and anterior open bite [25,26]. On the other hand, children who have hyperthyroidism may experience disorders such as accelerated tooth eruption, maxillary, and mandibular osteoporosis [25].

The parathyroid glands control the amount of vitamin D and calcium levels in the body, and calcium is the most important component of the teeth. In children with low parathyroid hormone levels, primary teeth may not form at all, or erupt long after normal age, or even have weaker enamel, which can increase the risk of tooth decay and cavities.

### Bone and skin diseases

Some skin and bone diseases can lead to delayed or stunted growth of primary teeth. These diseases are naturally genetic and inherited. Cleidocranial Dysostosis and Ellis van Creveld syndrome are conditions in which bones do not grow normally [24,27].

Delayed tooth eruption is frequently cited in cases of X-linked hypophosphatemic rickets (XLH) [9].

Children with bone growth disorders usually have abnormalities or deformities of the bones of the skull, forehead, jaw and clavicle or their deciduous teeth do not erupt completely, or they may not develop at all.

Ellis van Creveld Syndrome, which is relatively rare in the general population, is a condition characterized by short stature, shorter-than-normal limbs, the possibility of cleft lip and palate, and a variety of dental disorders [28]. The oral manifestations of this genetic disorder include hyperplastic frenula, absence of mucobuccal fold, indentation of the alveolar ridge, multiple small alveolar notches, partial cleft lip, enamel hypoplasia, peg-shaped laterals, neonatal teeth, conical and microdontic teeth, partial anodontia, and delayed eruption of teeth [29-31].

The distance between the teeth of children with this syndrome is probably large or abnormally shaped. In some, primary teeth do not erupt at all; while others are born with their teeth erupted before birth.

Cleidocranial dysplasia is a rare congenital bone disease specified by abnormalities such as the clavicles, skull, and jaw, as well as occasional prevention of growing or developing properly long bones [32,33]. Dental dysplasia manifests as the presence of multiple supernumerary teeth, the prolonged retention of deciduous teeth, and the delayed or failed eruption of the permanent dentition [34].

One of the congenital defects that cause abnormal changes in skin color is a skin pigmentation disorder that can also be one of the causes of the underdevelopment of teeth in children. Although most of the symptoms of this condition only involve different streaks of color on the skin, unfortunately, bones and teeth may also be affected.

Hypohidrotic ectodermal dysplasia is one of ectodermal dysplasia. Starting before birth, these disorders result in the abnormal development of ectodermal tissues, particularly the skin, hair, nails, teeth, and sweat glands [35]. This disorder is also characterized by several missing teeth (hypodontia) or malformed teeth. The teeth that are present erupt from the gums later than usual and are frequently small and pointed [36-38]. The delayed eruption is another anomaly that can be observed in these patients [39].

Incontinentia pigmenti is characterized by skin abnormalities that evolve throughout childhood and young adulthood. In early childhood, the skin may develop grey or brown patches which fade with time [40].

The oral manifestations of Incontinentia pigmenti can include dental abnormalities such as missing teeth, conical teeth, and delayed tooth eruption. Hypodontia was the most frequent dental anomaly in these patients [41,42]. Al-Abdallah and his colleagues reported the incidences of hypodontia in the permanent dentition of Incontinentia pigmenti [42].

### Malnutrition

This is one of the causes of delayed tooth growth. In this case, delayed growth of teeth is only one of the symptoms of malnutrition in the child. Children who experience stunted growth as a result of malnutrition are usually weaker, shorter, and underweight. This problem can be the result of poor breastfeeding or a lack of dry milk supplements. Children need vitamins A, C, D, as well as calcium and phosphorus. Deficiency of vitamins or minerals, especially vitamin D and calcium, can lead to the late development of teeth.

In 3 studies, the researchers indicated that Chronic and prolonged malnutrition during childhood is linked to both delays in tooth eruption and makes the tooth susceptible to dental caries [6,43,44].

Vitamin deficiencies are also associated with eruption delays. Moulis., *et al.* believe that vitamin A and D (rickets) deficiencies are significant systemic causes of eruption delay in permanent dentition [45].

### Conclusion

Although in most children who have no teeth, delayed tooth development is not a concern; in some infants, this problem may have a specific underlying cause. Late-growth of teeth is often genetic, and hypothyroidism and hypoparathyroidism can also be involved. The cause of the absence of permanent teeth is not fully understood. Genetics is one of the factors that play a role in this condition, but environmental factors and endocrine (hormonal) disorders can also be effective factors.

If there was no evidence of teeth eruption in the child after months, and there were no genetic factors had been found in any of the other family members, it is time to take him to the pediatrician for further examination. The pediatrician can determine whether the child's delayed growth is due to malnutrition, hypothyroidism or any other cause.

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