

# Premature loss of primary teeth and developing malocclusion: A review

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## ABSTRACT

The effect of premature loss of deciduous dentition on the developing permanent occlusal pattern is a matter of interest among the dentists. Premature loss of primary teeth would result in sagittal, vertical, as well as transverse malocclusion. The pathology of premature loss of primary teeth, especially the molars is a complex issue with profound impact on dental and facial harmony, thus urging the clinician's interest for an optimal therapeutic approach to attain a proper occlusion of the permanent dentition. The present article reviews the prevalence of premature loss of primary teeth and its effect on malocclusion.

**KEY WORDS:** Deciduous tooth, Early loss, Malocclusion

## INTRODUCTION

The development of the permanent dentition as a successor of primary dentition has a fairly predictable pattern in the typical child. Primary molar exfoliation results in the late mesial shift of permanent first molars, which in turn improve the molar relation from end-on to Class I.<sup>[1]</sup> Deviations from this typical pattern can have a negative effect on occlusion and alignment. The most common etiology of premature loss of primary teeth is associated with dental caries.<sup>[2,3]</sup> Other causes of premature loss of primary tooth include trauma, ectopic eruption, congenital disorders, and arch length deficiencies.<sup>[4,5]</sup> Other less common etiology includes severe pink disease (acrodynia) and in local disease of bone such as osteitis and eosinophilic granuloma.<sup>[4]</sup> The effect of premature loss of deciduous teeth on the development of the permanent dentition is a matter of great interest among the dentists.<sup>[6]</sup>

## CAUSES OF PREMATURE EXFOLIATION (FIGURE 1)

### Dentin Dysplasia (DD)

DD is a rare genetic disorder of dentin development with an autosomal dominant pattern of inheritance.

DD is classified into two main classes depending on its clinical and radiologic appearance,<sup>[7]</sup> namely, type 1 (radicular DD) and type 2 (coronal DD). DD may present with either mobile teeth or pain associated with spontaneous dental abscesses or cysts.<sup>[8]</sup>

### Acrodynia

Acrodynia is principally a syndrome associated with chronic mercury poisoning, mostly affecting infants and young children. The syndrome is also known as pink disease. Symptoms include pink hands and feet, scarlet tip of nose and cheeks, extreme irritability and restlessness, insomnia, anorexia, pain in extremities, generalized skin rashes, photophobia, desquamation, itching, salivation, and loss of teeth.<sup>[9]</sup>

### Radiation

Radiation therapy increases the risk of dental caries and poor oral hygiene. Prolonged exposure causes osteoradionecrosis (ORN). ORN is defined as an area of exposed irradiated bone tissue that fails to heal over a period of 3 months without a residual or recurrent tumor.<sup>[10]</sup> It may lead to increased tooth mobility and subsequent tooth loss.<sup>[11]</sup>

### Acatlasia

Acatlasia also known as acatalasemia or Takahara's disease is an autosomal recessive peroxisomal disorder caused by a complete lack of catalase.

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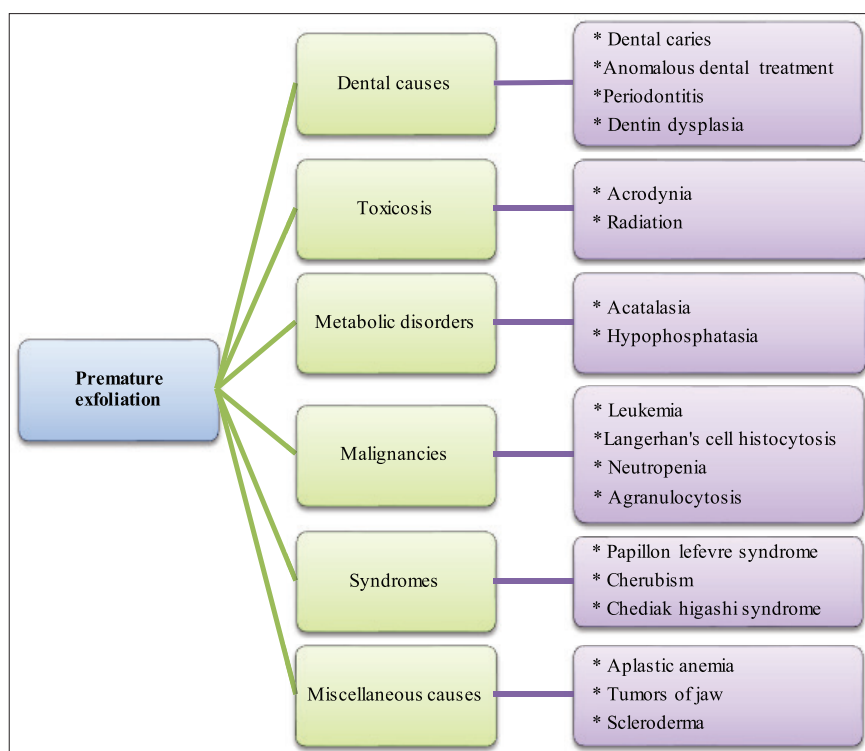
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**Figure 1:** Causes of premature loss of primary teeth

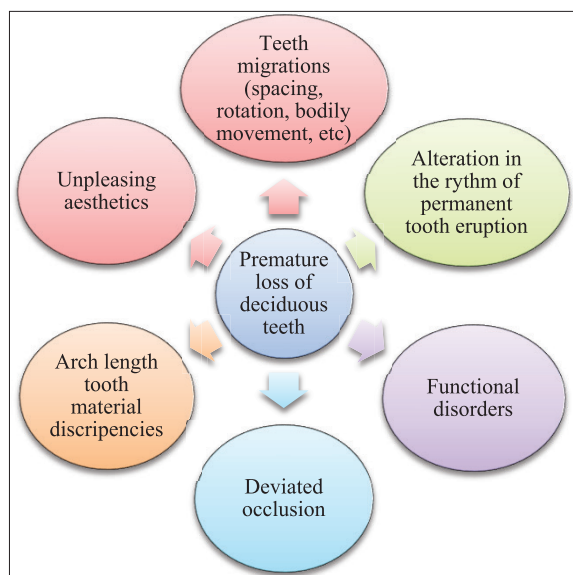
**Table 1: Effects of premature loss of deciduous tooth on occlusion**

Primary tooth lost	Effects	References
Incisor	More common in maxillary incisors than mandibular due to ECC Other common reason for incisor loss at early stage is trauma Space loss is minimal unless there are crowding, excess overjet, or deep overbite Minimal effect on mastication	[3,14]
Canine	Affects phonetics if lost at very younger age Unilateral loss of primary canines causes shift of incisors toward the affected side, thus resulting in midline discrepancies Bilateral loss result in lingual tipping of mandibular incisors	[3,15,16]
First molars	Rarely causes posterior tooth loss Commonly lost due to dental caries and infection Minor mesial shift of primary second molars	[17-20]
Second molars	Migration of primary canines and permanent incisors toward the edentulous space Loss of arch length in maxilla occurs more commonly than mandible Space loss is worst when tooth is lost before the eruption of permanent first molars	[3]

ECC: Early childhood caries

**Table 2: Studies on the effects of premature loss of primary dentition**

Study result	Reference
Premature loss of primary molars may result in reduced arch length, which will cause crowding and rotations	[21]
The highest quantity of space loss was observed in the first 6 months after the loss of primary molar	[22]
Patients with premature loss of molars have significantly less space in both arches	[23]
Early loss of temporary molars shows a statistically significant increase in the frequency of malocclusion and the need for treatment	[4]
Length reduction was higher in the maxilla, compared to the mandible, and also that the distal migration of the canine was observed only in the lower jaw.	[24]
The premature loss of the maxillary first primary molar and/or second primary molar lead to a reduction in space up to 3 mm to 4 mm, compared to the control group	[25]
Mesial migration of the first permanent molar occurs in arches with crowding potential. Every millimeter loss of lee-way space resulting in an extra 0.305 mm mesial inclination	[26]
Space reduction and dislocation of the permanent canine and incisors toward the extraction site occurs when primary molars are lost, which calls for an immediate use of a space maintainer	[20]
No space loss in few cases of premature extraction of incisors or canines	[27]
There were no cases of space loss when anterior primary incisors were lost prematurely	[28]
Space loss in the anterior region was noted in only 2% of the 167 prematurely lost primary anterior teeth	[29]



**Figure 2:** Effects of premature loss of primary teeth - overview

This disorder is relatively benign, but it causes an increased incidence of periodontal infections and tooth loss.<sup>[12]</sup>

## HYPOPHOSPHATASIA

Hypophosphatasia is a rare and sometimes fatal genetic metabolic bone disease that is defined by a lack of development in the skeletal anatomy. The disease is characterized by soft or unformed bones and teeth. Tissue non-specific alkaline phosphatase deficiency in osteoblasts and chondrocytes impairs bone mineralization causing rickets or osteomalacia. Abnormal cementum formation leads to premature exfoliation.<sup>[13]</sup>

## EFFECTS OF PREMATURE LOSS OF PRIMARY TEETH

Adverse effects of losing a deciduous tooth prematurely cause several disturbances to the developing permanent occlusion (Table 1). An overview on the effects of losing primary teeth is briefed in Figure 2.

## DATA ON THE EFFECT OF PREMATURE LOSS OF PRIMARY TEETH

Studies from the literature have proven the occlusal disturbances caused due to premature loss of primary teeth using various parameters. Some of their results are tabulated in Table 2.

## CONCLUSION

Premature loss of primary dentition due to dental caries has a significant effect on dental occlusion.

Hence, parents must be educated about the importance of safeguarding their children primary teeth and should be emphasized about the need for regular dental checkup and early intervention of malocclusion.

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