

# Dental anomalies in preterm children: A Review

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## Abstract:

**Aim:** To do a review on the dental anomalies in preterm children.

**Objective:** To find out the different anomalies present in the oral cavity in preterm children.

**Background:** Preterm and low birth weight infants comprise approximately 6% of the total live births. Apart from medical problems they also have dental anomalies. Studies have shown a high prevalence of generalized enamel hypoplasia in the primary dentition of around 40-70 per cent in preterm children which is likely to be associated with low bone mineral stores. Enamel hypoplasia, crown dilacerations, and palatal distortions are other dental defects observed in preterm children.

**Reason:** The current review would analyse the dental anomalies in preterm children so as to be aware of the possible anomalies they might develop the children can also be monitored and treatment intervention can be done at an early stage.

**Keywords:** low birth weight, tooth anomalies, tooth eruption, dental defects. Preterm

## Introduction

### Prematurity

In developed Western nations, Preterm births which occur prior to 37 weeks gestation consists of approximately 6 per cent of all the live births. The birth weight of preterm children is often well below that of the average birth weight of 3.3 kg, with the lowest birth weights being experienced by those with the shortest gestational ages. The survival rates of low birth weight children ranges from >95 per cent for birth weights with 2000-2500 g to around 50 per cent for those with birth weights of 700-800 g. The survival rates of the preterm children have improved dramatically in the recent years due to advanced treatment in the neonatal hospitals, even neonates with birth weights of around 500 g usually have a 10 per cent chance of survival. [1,2] Many causative factors for premature birth exist, among which some are associated with maternal and fetal diseases, but often the etiology remains unclear (Yu, 1989), and inborn factors of the child may be of importance. The immaturity of many organs makes a prematurely born infant more prone to neonatal complications and systemic derangements, [3] Several studies regarding the growth and development of preterm infants with low birth weight signify that, although there might be complications present on the physical growth some time after birth, they are usually corrected by catch up growth (the growth that occurs at a higher rate than estimated for the age and gender of the child in response to nutritional rehabilitation). [4,5]

### Complications of prematurity

Premature infants are poorly prepared for extra uterine life. Many weeks of intensive neonatal care are required for the early and early preterm infants. All the major organ systems are prone to serious complications which may occur. The most susceptible organs are the brain, the lungs, and the eyes. Moreover, the infants are at high risk of infections either at or shortly after birth or at a later age. (6,7) Because premature infants often have respiratory distress syndrome resulting from immature lung tissues and a deficiency of surfactant (the mixture of lipoproteins excreted by the alveolar epithelium that lowers surface tension), they have to be treated with oxygen ventilation through an oro-oronasotracheal tube in combination with surfactant administration. Oxygen can also be supplemented with continuous positive airway pressure. (7) Infants aged 35–36 gestational weeks are mature enough to suck and swallow milk. Less mature infants will need to be fed with breast milk supplemented with proteins, calories, and minerals through an oro-or nasogastric tube. (7)

The early and long-term effects of birth prematurity on the physical and psychological growth and development of the child are subjects of considerable current interest. Many studies have suggested that during early childhood, preterm children show a significant delay in many areas of physical and psychological growth and development. Although 'catch-up' growth has been reported in later childhood, some studies have indicated that long-term delays into adolescence may occur. [3]

Pre term children, especially the early preterm children, were shorter, had lower weight, and had a smaller head circumference than full-term controls. (8)Also, less muscle mass has been reported among pre term children. (9)Behavioral symptoms observed in pre

term children included increased rate of hyperactivity, difficulties in concentration, and below-grade-level performance at school. (8,10)

In a study conducted by Benjamin et al, 100 (5.55%) pregnancies resulted in Low birth weight neonates out of total 1800 pregnancies. Out of 100 low birth weight infants, 93 survived beyond four weeks of life. (11)

#### Oral defects

Premature birth can also affect the facial bones and dentition. Several studies on the oral defects in infants have shown that premature birth can cause enamel defects like enamel hypoplasia, qualitative change in the translucence of the enamel, or a combination of both. These effects are usually located on the primary teeth, which are undergoing mineralization around the time of the premature birth, although even permanent teeth can be affected. (12) The pathogenesis is measured multi factorial, the most important factor being calcium disturbances in the neonatal period. However, the contributing causes of the enamel defects include local trauma from laryngoscopic and endotracheal intubation, which abuts against the maxillary anterior alveolar ridge.(13)

Other defects, like the notching of the alveolar ridge, palatal grooving, high arched palate, dental crossbite, and palatal asymmetry, have also been reported in large numbers when compared with full-term controls. Moreover, delayed eruption and developmental defects of both the primary and permanent dentitions have also been noted.(12) Many of the studies regarding the altered morphology have also highlighted that the pressure from the oro-or nasotracheal tube or direct trauma from the laryngoscope when the tube is placed might account for the defects.(14) Thus, the presence of the tube on the palate can conceivably inhibit a normal growth process, and it has also been discussed whether altered morphology of the alveolar ridge and palate can be eliminated by compensating remodeling and growth.(13) Possibly, the altered palatal morphology in the pre term infants can lead to an increase in malocclusions such as cross bite, resulting in an increasing need for orthodontic treatment. Moreover, changes in the path of eruption of teeth, which can influence the occlusion and tooth spacing, can also contribute to an increasing need for orthodontic treatment.

#### Oral complications

Studies suggest that birth is the stimulus for tooth eruption and the eruption time is the same in preterm infants as for full-term infants. (15)

Delayed dental eruption and dental caries are more significant in preterm children as compared to the full term infants. This increased risk is due to the local trauma and systematic factors including neonatal asphyxia, respiratory distress syndrome, hyperbilirubinemia and neonatal infection. Premature loss of teeth and malformation of the oral cavity can lead to speech and appearance problems.(16) The prevalence of dental defects is significantly higher in prematurely born children than in their full term counterparts, including enamel hypoplasia, which are reported to exist in both the primary and permanent dentition and are thought to be associated with a number of systemic derangements typical of pre-term birth, notably hypocalcaemia, metabolic and nutritional disorders, neonatal infections and respiratory distress syndrome.(3) Prematurely born children show an increased prevalence of developmental defects in enamel in the primary dentition. The incidence can be as high as 96%. It has been shown that children born preterm also have an increased frequency of enamel defects in the permanent dentition. However, few studies have been made concerning enamel defects in the permanent dentition of children born preterm and none has prospectively studied both primary and permanent dentitions in the same children.(3)

#### Primary dentition

In a study conducted, the mean mesio distal dimensions of the teeth appeared to be directly related to birth weight, with the very low birth weight groups showing the smallest dimensions and the normal birth weight groups showed the largest dimensions. The low birth weight groups showed measurements in between those of the very low birth weight and normal birth weight groups. (17)

In case of maxillary central incisors, in the very low birth weight group, the mean mesio distal dimension was 9% less as compared to the normal birth weight group children. In case of maxillary lateral incisors, In the very low birth weight group, the mean mesio distal dimension was 11% less as compared to the normal birth weight group. (18)

The mandibular central and lateral incisors of the very low low birthweight children has the smallest dimensions as compared to the normal birth weight children. (18)

In another study conducted, all 15 children showed dental defects of the primary dentition. Three children (20%) had only dental opacities. In 7 other children, the opacities and hypoplasia were present in different teeth. These opacities, which consisted of white or yellow brownpatches, were located mainly on the buccal and occlusal surfaces. 12 children (80%) showed hypoplasia of at least one tooth. The teeth most commonly showing hypoplasia were the maxillary primary central and lateral incisors followed by the maxillary and mandibular canines. On the other hand, the mandibular first primary molar and canine were the teeth most commonly showing opacities followed by the mandibular second primary molar. (19)

In a study comparing three birth weight groups including a control group of normal birth weight children, Seow and co-workers reported a direct relationship of birthweight and gestational age with the prevalence of enamel defects, that is, the VLBW group showed a very high prevalence of enamel defects of over 70 per cent, compared with 50 and 20 per cent in the LBW and NBW gr

o u p s respectively. (18) .This high prevalence of enamel defects in the primary dentition of the VLBW group had been confirmed in two more recent studies. (20, 21)

#### Permanent dentition

In another study conducted 13 (33%) very low birth weight children showed enamel opacity of at least one permanent tooth, and another four (10%) had enamel hypoplasia of at least one permanent tooth, giving a total prevalence of 17 (43%) children affected with enamel defects. In contrast, only six (15%) of the normal birth weight children had enamel opacity, and another four (10%) had enamel hypoplasia of at least one permanent tooth, giving a total prevalence of 10 (25%) children with enamel defects. Overall, the prevalence of enamel defects in the very low birth weight group was significantly higher than the normal birth weight group. (22)

In the very low birth weight group, four (3%) of the 141 permanent first molars examined showed enamel hypoplasia, and 24 (17%) showed enamel opacity, yielding a total of 30 (20%) teeth affected with enamel defects. Of the normal birth weight children, identical numbers of first permanent molars with enamel hypoplasia compared to the very low birth weight group were found. Only 10 (8%) teeth were affected with enamel opacity, giving a total of 14 (11%) teeth affected with enamel defects. The difference in total prevalence of enamel defects in the permanent first molars between the two groups was statistically significant. In contrast, in the case of the permanent central incisors, although the very low birth weight group showed a slightly higher percentage of enamel defects (5%) than the normal birth weight group (2%), the difference was not significant. However, in the case of the permanent lateral incisors, there was a prevalence of enamel defects of 12% in the very low birth weight compared with 0% in the NBW group. (22)

One other report, which included a group of 38 premature children with at least one maxillary incisor, gave a prevalence of enamel hypoplasia in the permanent central incisors of 58%, but other permanent teeth were not examined. (23)

#### Conclusion

Preterm children have a higher prevalence of enamel defects than normal birth weight children. They also have a higher prevalence to enamel hypoplasia. Also the tooth eruption and development is significantly delayed in preterm infants as compared to normal birth weight children. Further research has to be done to get a better insight about pre term children and the dental anomalies associated with them.

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