

# Circular Enamel Hypoplasia: A Rare Enamel Developmental Disturbance in Permanent Teeth

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## ABSTRACT

Circular enamel hypoplasia, a type of enamel hypoplasia is an extensive enamel disturbance that results in a demarcating line surrounding the crown of the injured teeth visible both clinically and radiographically that most frequently occurs as a result of trauma in children around the age of two years. Clinical features include poor aesthetics, dentin sensitivity, increased susceptibility to dental caries and malocclusion. Early radiographic diagnosis of such teeth is important for timely intervention and subsequent treatment.

**Keywords:** Circular enamel hypoplasia, Developmental defects, Demarcating line, Enamel matrix, Esthetics, Traumatic injuries

## CASE REPORT

A 10-year-old girl reported to the Department of Pedodontics and Preventive Dentistry, ITS-CDSR Muradnagar, India, with chief complaint of discoloured right upper front tooth and sensitivity to hot and cold food since one month.

On clinical examination [Table/Fig-1], the maxillary right central and lateral incisor showed yellowish discoloration of crown on the labial surface. On examination with blunt probe, there was a breakdown in the continuity of enamel (labial surface) with slightly brownish discoloration around the cervical region of maxillary right central incisor suggestive of enamel hypoplasia. Patient was sensitive to cold and it was confirmed by performing cold test. Maxillary right and left lateral incisors were partially erupted. They also showed slight discoloration and mild pitting thus showing signs of enamel hypoplasia. Intra oral examination showed mixed dentition period, localised bleeding on probing confined to maxillary and mandibular incisors and pit and fissure caries in left upper first primary molar. The left primary maxillary canine was missing as it had shed physiologically. On the basis of thorough visual and tactile clinical examination, provisional diagnosis of enamel hypoplasia was made.

After obtaining detailed case history from parents, it was found that the patient had suffered traumatic injury seven years back while playing at home, which caused intrusion of her primary anterior teeth. They visited a local hospital for treatment where the lacerated

wounds were taken care of and was kept on follow up to monitor her teeth.

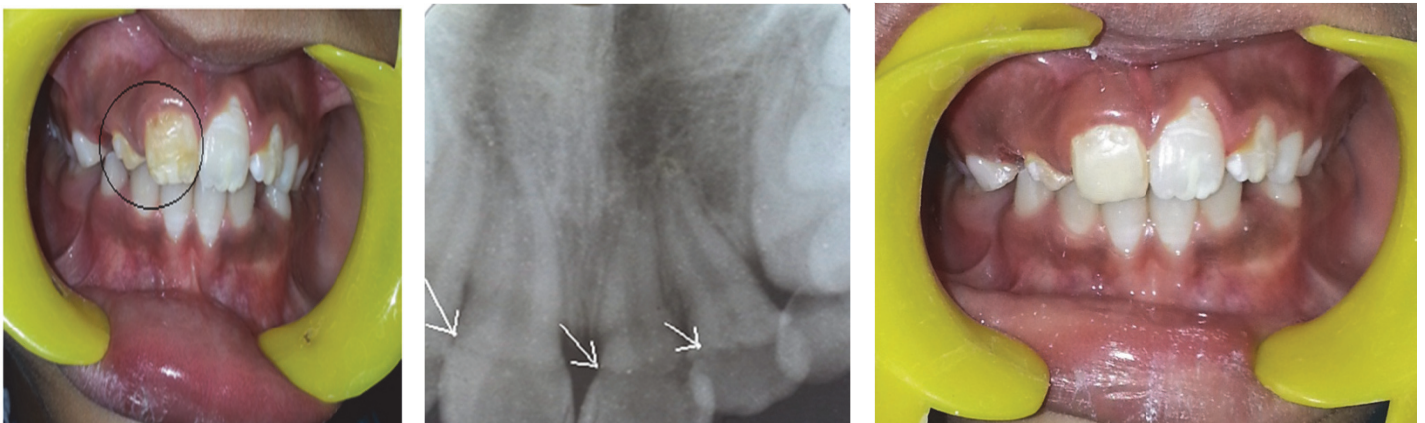
Radiographic investigation revealed loss of enamel especially around the cervical region of maxillary right central and lateral incisor. A horizontal line around the cervical area of the crown was clearly seen in maxillary right central and lateral incisor and maxillary left central incisor confirming Circular Enamel Hypoplasia [Table/Fig-2].

On the basis of clinical examination and radiographic findings, the final diagnosis of circular enamel hypoplasia (Type IV) in right maxillary central and lateral incisors and type I Enamel Hypoplasia in left maxillary central and lateral incisors was made.

Oral prophylaxis followed by topical fluoride application was done in the first visit. Composite resin restoration was done on maxillary right central and lateral incisor [Table/Fig-3]. Pit and fissure sealant application was done on right and left upper and lower first permanent molars. Left upper first primary molar was restored using GIC restoration.

## DISCUSSION

Enamel Hypoplasia is a developmental disturbance that may be defined as an incomplete or defective formation of the organic enamel matrix of teeth [1]. Hypoplasia was categorized into the following types by Silberman et al., as [2].



[Table/Fig-1]: Pre-operative photograph showing enamel hypoplasia [Table/Fig-2]: IOPA showing circular enamel hypoplasia [Table/Fig-3]: Post-treatment photograph

**Type I Hypoplasia:** enamel discoloration due to hypoplasia.

**Type II Hypoplasia:** abnormal coalescence due to hypoplasia.

**Type III Hypoplasia:** some parts of enamel missing due to hypoplasia.

**Type IV Hypoplasia:** a combination of the previous three types of Hypoplasia (Circular Enamel Hypoplasia).

Traumatic injuries to primary teeth are very common in early childhood affecting 4% to 30% of all children, and the most frequently affected teeth being the maxillary central incisors [3-7]. As a result developmental defects in the permanent dentition vary from 12% to 69% [3,8,9]. Enamel hypoplasia due to trauma may vary from white to mild brownish discoloration of the enamel to severe pitting and irregularity of the crown of the tooth. Circular Enamel Hypoplasia as the name suggests is a form of hypoplasia of enamel which is seen as a horizontal line surrounding the crown of the tooth in the cervical area, on the successor teeth as a consequence of trauma to primary teeth [3,4,10].

Clinically, enamel hypoplasia presents with unfavourable aesthetics, increased dentin sensitivity, increased dental caries susceptibility, increased wear and malocclusion.

Orofacial trauma is a serious health problem that has great psychological and physical impact on young children and their parents. Children at the ages of 1-4 years are the most affected, because during this stage, they have inadequate motor control and tend to fall quite often [11,12]. In the age group 0-6 years, oral injuries are ranked as the second most common and covering 18% of all somatic injuries.

Developmental disturbances during tooth development manifested as enamel hypoplasia can be the result of hereditary factors (as in Amelogenesis imperfecta and Trichoosseous syndrome) or environmental factors such as nutritional deficiency, exanthematous diseases, congenital syphilis, local infection or trauma, hypocalcemia, ingestion of fluorides and birth injury. The frequency of developmental disturbances of enamel in the permanent teeth as a result of traumatic injuries to their predecessors have been found to be high [3,8,9]. Developmental disturbances of the permanent teeth involving crown are more common as compared to those involving the roots due to the close relationship between roots of primary teeth and crowns of permanent successor. In this reported case also developmental disturbance has occurred in crown. Most prevalent sequelae in permanent dentition due to traumatic dental injuries are associated with luxative injuries (intrusive, extrusive luxation) and avulsion because of their close relationship between roots of primary teeth to crowns of permanent teeth. Since most of the injuries occurs in 1-3 years, during the earliest phase of odontogenesis, intrusion of primary teeth frequently results in malformation of permanent tooth germ. Intruded primary teeth alter the secretory phase of ameloblasts and destroy the enamel matrix by invading the follicle of permanent tooth germ, thus arresting the localised crown development.

In the present reported case, the intrusive traumatic injury to primary teeth occurred when child was two years and six months of age that likely disturbed the enamel matrix of permanent incisors leading

to defective crown formation and caused changes in colour and crown morphology. Yellow-brown discoloration of crown could be explained by the incorporation of hemoglobin products from bleeding in the periapical area and enamel hypoplasia is caused by the destruction of ameloblasts in the active enamel epithelium [5]. In the present reported case, aesthetic management of maxillary permanent incisors affected by circular enamel hypoplasia was done. Patient is under observation and frequently recalled for preventive treatments so that further damage to pulp can be prevented.

Circular enamel hypoplasia is an extensive enamel disturbance resulting in a demarcating line surrounding the crown of the injured teeth which most frequently occurs as a result of trauma in children around the age of two and half years. This developmental defect can be easily detected during radiographic investigation before the tooth eruption, unlike other enamel defects, which can only be diagnosed following crown eruption [3,8]. The early diagnosis is important in such kind of injuries, because it not only determines the appropriate clinical intervention but also minimizes damages to the dentin and pulp but both the patient's and parents cooperation is required for attending recall appointments.

## CONCLUSION

This case report stresses the effects of traumatic injuries in early childhood to the permanent dentition and also differentiates circular enamel hypoplasia from other forms of enamel hypoplasia which goes undiagnosed. Periodic follow-up of the injured teeth is essential not only for the traumatised teeth but also for the successor so that early diagnosis and appropriate clinical intervention is made to minimise the damage.

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