

Enamel Hypoplasia Aesthetic Management: A Case ReportDr. Pradnya V. Bansode¹, Dr. Seema D. Pathak², Dr. M. B. Wavdhane³, Dr. Laxman D Phad⁴.¹Professor and Head of Department of Conservative Dentistry and Endodontics. Govt Dental College & Hosp, Aurangabad.²Associate Professor, ³Associate Professor, ⁴Post Graduate Student**Corresponding Author:** Dr. Laxman D Phad , Post Graduate Student, Department of Conservative Dentistry and Endodontics. Govt Dental College & Hosp, Aurangabad.**Type of Publication:** Case Report**Conflicts of Interest:** Nil**Abstract**

Enamel Hypoplasia is an exclusive ectodermal disturbance, related to alterations in the organic enamel matrix which can cause white flecks, narrow horizontal bands, lines of pits, grooves and discoloration of the teeth varying from yellow to dark brown. Depending on type, timing and duration of insult, a variety of hypoplasia's can occur. Chronological hypoplasia (linear enamel hypoplasia) is a specific type of hypoplasia occurring due to environmental insult unlike amelogenesis imperfecta that has a genetic component. Even clinically they can be distinguished from other types of hypoplasia's due to its multiple, symmetrical, chronological pattern, linear, ring-like pattern involving all surfaces of tooth. Depending on severity, chronological hypoplasia can cause problems like aesthetic problems, tooth sensitivity, caries susceptibility, occlusal wear, loss of vertical dimension, early pulpal involvement.

Prevention of interaction of aetiological factors is not possible because multiple factors are required for enamel synthesis. This paper highlights how to diagnose, intercept and treat chronological hypoplasia.

Conclusion: EH is quantitative enamel defect associated with a broad spectrum of aetiologies. Appropriate

interventions and early dental treatment may help prevent destruction and loss of the dentition.

Keywords: Enamel Hypoplasia, Management, Environmental hypoplasia, Diagnosis, Prevention

Introduction

Permanent human anterior teeth begin calcification at 3-12 months and complete enamel formation by 4-7 years of age. The presence of enamel defects is highly dependent on conditions occurring during critical time of enamel formation and mineralization.¹ Disturbances during tooth development can be manifested as enamel hypoplasia, diffuse or demarcated enamel opacities or enamel hypo mineralization. Enamel Hypoplasia is an exclusive ectodermal disturbance, related to alterations in the organic enamel matrix which can cause white flecks, narrow horizontal bands, lines of pits, grooves and discoloration of the teeth varying from yellow to dark brown.² Enamel defects have been connected with a broad spectrum of aetiologies together with genetic and epigenetic factors such as local, systemic and environmental factors.¹

Chronological hypoplasia (linear enamel hypoplasia) is a specific type of hypoplasia occurring due to environmental insult unlike amelogenesis imperfecta that

has a genetic component. Even clinically they can be distinguished from other types of hypoplasia's due to its multiple, symmetrical, chronological pattern, linear, ring-like pattern involving all surfaces of tooth.^{4,6} Depending on severity, chronological hypoplasia can cause problems like aesthetic problems, tooth sensitivity, caries susceptibility, occlusal wear, loss of vertical dimension, early pulpal involvement.^{4,6}

Aesthetic problems in female children especially are associated with psychological crisis and will require early interception.⁵ Most of the cases mentioned in the literature have rarely been able to correlate aetiological factors and positive history. All environmental factors cannot be recollected by patients or their guardians. A uniqueness in the present case report is that there was a positive correlation between malnutrition (specific) at a particular age (1–2 years) and the specific clinical presentation (area of tooth involvement that mineralises corresponding to 1–2 years).⁵ However, it would be difficult to pinpoint which particular deficiency caused hypoplasia because enamel formation requires several nutritional factors.⁵

Prevention of interaction of aetiological factors is not possible because multiple factors are required for enamel synthesis. This paper highlights how to diagnose, intercept and treat chronological hypoplasia.

Case Presentation

16 years, female had come with a complaint of ugly looking front teeth. Further history revealed that the patient noticed scratches on surface of many of her front teeth ever since the successor tooth erupted into the oral cavity. Primary teeth did not have one such abnormality. No positive history of trauma was present. Child belonged to Middle socio-economic strata. The parents accompanying the child were enquired regarding pre-natal and post-natal history. Mother's obstetric history was non-contributory. child's postnatal history revealed that

the child was hospitalised for a prolonged period for 2-3 time around the age of 1–3 years. Intraoral examination revealed dentition corresponding to chronological age. Hypoplasia (quantitative deficiency) was seen in several teeth. The distribution of hypoplasia showed a characteristic presentation which was symmetrical, chronological, and presented as a linear groove, ring like defect around the tooth (buccal, lingual, mesial and distal). The ring, linear groove like deformity was seen in the middle 1/3rd & cervical 1/3rd of upper & lower incisor, all 4 canines and cusp tips of 13, 23. Yellowish brown discoloration with 11, 13, 21, 23, 41, 42 at middle 3rd (Figs A, B, 1, 2, 3)

Diagnosis

Based on clinical presentation—multiple, symmetrical, chronological pattern of tooth calcification, linear groove, ring-like pattern involving all surfaces of the teeth—a diagnosis of chronological hypoplasia (linear enamel hypoplasia) was given. The chronological pattern showed the systemic illness would have occurred around the age of 1–2 years; this coincided with the patient's hospitalisation history. Malnutrition is believed to be the cause of hypoplasia.

Treatment Procedure

Treatment planning was done considering conservation of tooth structure and aesthetics. Partial Composite veneers as opposed to ceramic veneers were planned keeping in mind the young permanent dentition. During the initial appointment, thorough oral prophylaxis was done. Under rubber dam isolation, macro abrasion was done using 12 & 30 fluted tungsten carbide bur to remove defective enamel & then to reduce yellowish brown discoloration micro abrasion done by using 11% HCL pumice slurry. Then tooth were restored with light cured composite restoration. Instructions given to patient & recalled for follow up.



Fig. 1 : Preoperative photograph shows ring, horizontal groove like deformity at middle 3rd of tooth & at same level discoloration with upper & lower anterior teeth.



Fig. 2: Mirror image shows palatal surface of incisors & canines with ring, linear groove deformity



Fig. 3 : Teeth cavities after macro & micro abrasion.



Fig.1,2,3 -preoperative images.

Fig .4,5,6- post operative images after light cured composite restoration

Discussion

Clinical significance of Linear Enamel Hypoplasia includes poor aesthetics, tooth sensitivity, malocclusion and structurally damaged primary teeth that are particularly vulnerable to dental caries.⁸

An early diagnosis and treatment planning of Linear Enamel Hypoplasia is required. Following approach can be useful:

1. Risk recognition
2. Early diagnosis
3. Anticipation of caries and post eruption breakdown
4. Remineralization and desensitization
5. Restorations and extractions; and
6. Maintenance.⁷

Enamel Hypoplasia (EH) can be defined as a partial or imperfect development of the enamel matrix of teeth. Two fundamental types of EH subsist:¹¹

1. Enamel Hypoplasia caused by environmental factors
2. Enamel Hypoplasia caused by hereditary defects (amelogenesis imperfecta).

Almost all visible environmental enamel defects can be classified into one of the three patterns:[6]

1. Hypoplasia
2. Diff use opacities
3. Demarcated opacities.

Classification of enamel defects recorded in the study done by Littleton and Townsend based on the developmental defects of enamel:¹⁰

Types of defects (hypoplasia only)

Pits

Grooves: Horizontal

Grooves: Vertical

Missing enamel

Number and demarcation

Single

Multiple

Diff use: Fine white lines

Diff use: Patchy

Environmental Enamel Hypoplasia can be caused by a number of different factors each capable of producing injury to the ameloblasts which include: Nutritional insufficiency (vitamins A, B, C and D); Exanthematous diseases (e.g.: Measles, chicken pox, scarlet fever); birth injury; congenital syphilis; hypocalcaemia; prematurity, Rh haemolytic disease; local infection or trauma and fluorides.¹¹

If the interference takes place in the 1st year (called the infancy period), the permanent teeth affected are the first molars, the incisors (except the maxillary lateral incisors), and the canine teeth. It is striking that the maxillary lateral incisors mineralize after the central incisors and canines, approximately after the age of 10 months. If the interference takes place in early childhood (approximately 13-34 months) the maxillary lateral incisors and premolars which begin to calcify during this period are also affected.⁹

Restorations with glass ionomer cement, composite, stainless steel crowns, full veneer metal-ceramic crowns, fixed-removable partial dentures and or implants are the different treatment options that are discussed in various

studies. Extraction should be considered if teeth are nonrestorable.^{12,13} In extraction cases, moreover an interdisciplinary approach should be planned for restoration of function in young children. Acrylic jigs or custom-made bite blocks can be given to prevent effects of attrition.¹²

Conclusion

Enamel Hypoplasia is quantitative enamel defect associated with a broad spectrum of aetiologies. Appropriate interventions and early dental treatment may help prevent destruction and loss of the dentition. Tooth coloured light cured composite is a conservative treatment modality for the affected teeth. Result obtained in this case is very encouraging.

References

1. Musale PK, Yadav TK, Bijle MN. Clinical Management of an Epigenetic Enamel Hypoplasia-A Case Report. International Journal of Clinical Dental Science. 2011 Jan 30;1(1).
2. Shah P, Shah M, Parikh K, Khan F. Enamel hypoplasia: The multidisciplinary approach - 3 case reports. J Dent Sci 2012; 2:48-50.
3. Dubey, Alok. (2015). Esthetic Management of Turner's Tooth. Chetnad Health City Medical Journal. 4. 191-193.
4. Hutchinson DL, Larsen CS. Determination of stress episode duration from linear enamel hypoplasias: a case study from St. Catherines Island, Georgia. Hum Biol 1988;60:93-110 [PubMed] [Google Scholar]
5. Jayam C, Bandlapalli A, Patel N, Choudhary RS. Chronological hypoplasia: aesthetic management. Case Reports. 2014 Jun 6;2014: bcr 2013202892.
6. Skinner MF, Pruetz JD. Reconstruction of periodicity of repetitive linear enamel hypoplasia from perikymata counts on imbricational enamel among dry-adapted chimpanzees (*Pan troglodytes verus*)

- from Fongoli, Senegal. *Am J Phys Anthropol* 2012 Nov;149(3):468-82. 8] Peters LB, Wesselink PR, Moorer WR. The fate and the role of bacteria left in root dentinal tubules. *Int Endod J* 1995;28:95 -9.
7. Umapathy T, Jayam C, Yogish P, Yogish A, Bandlapalli A. Linear Enamel Hypoplasia. *J Indian Aca Oral Med Radiol* 2013; 25(2):0-0.
 8. Hypoplasia associated severe early childhood caries— a proposed definition. *J Dent Res* 2012 Jun;91(6):544-50. Epub 2012 Apr 23 12]
 9. Paranjpe A, Risbud M, Kshar A. Environmental enamel hypoplasia: A case report. *J Res Adv Dent* 2013; 2:65-8.
 10. Littleton J, Townsend GC. Linear enamel hypoplasia and historical change in a central Australian community. *Aust Dent J* 2005;50:101-7.
 11. Rajendran A, Sundharam S. Shafer's Textbook of Oral Pathology. 5th ed. India: Elsevier; 2006. 16] Al-Rahabi M, Abdulkhayum AM. Single visit root canal treatment: Review. *Saudi Endod J* 2012; 2:80-4.
 12. Gotler M, Ratson T. Molar incisor hypomineralization (MIH)— a literature review. *Refuat Hapeh Vehashinayim* 2010 Apr;27(2): 10-8, 60.
 13. McDonald S, Arkutu N, Malik K, Gadhia K, McKaig S. Managing the paediatric patient with amelogenesis imperfecta. *Br Dent J* 2012 May 11;212(9):425-8.