Case Report

A rare case report of the clinical management of Enamel hypoplasia of epigenetic origin

Leena Verma*, Ravi Kant Sharma**, Ramandeep Singh***

*Department of Pedodontics, Dr. H. S. J. Institute of Dental Sciences and Hospital, Panjab University, Chandigarh-160014, India
**Department of Biochemistry, Dr. H. S. J. Institute of Dental Sciences and Hospital, Panjab University, Chandigarh-160014, India
***Department of Biochemistry, Panjab University, Chandigarh-160014, India

DOI : 10.5455/jrmds.20142215

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 & discolouration of the teeth varying from yellow to dark brown. Dental enamel defects have been associated with a broad spectrum of etiologies including genetic and epigenetic factors such as systemic, local and environmental factors. Systemic conditions such as perinatal or prenatal illnesses, low birth weight, regular antibiotic consumptions, malnutrition, celiac disease and respiratory disorders like asthma are associated with enamel defects. A rare case of enamel hypoplasia of epigenetic origin and the clinical management for the same is presented in this case report.

Keywords: Bronchial asthma, enamel hypoplasia, epigenetic

INTRODUCTION

Enamel Hypoplasia (here after known as “EH”) is quantitative enamel defect, having reduced thickness of enamel [1,2]. Enamel formation is a complex and highly regulated process. Hypoplasia results only if the injury occurs during the formative stage of enamel development. Once the enamel has calcified no such defect can be produced. The normal development of enamel occurs in three stages. In the first stage the enamel matrix forms, in the second stage the matrix undergoes calcification and in the third stage crystallites enlarge and mature. Local or systemic factors that interfere with the normal matrix formation causes enamel surface defects and irregularities called enamel hypoplasia [3,4]. Timing of ameloblastic damage has a great effect on location and appearance of the defect in the enamel. The altered enamel may be localized or present on numerous teeth. It may involve all or part of the surface of each affected tooth. EH has been associated with increased prevalence of caries. The primary clinical problems are tooth sensitivity, loss of vertical dimension, dysfunction and aesthetics. Pulpal involvement may occur in severe cases. The crown of the teeth may not have usual contour of enamel but have roughly square shape. Occlusal surface of posterior teeth are flat with low cusps. Treatment planning for patients with EH is related to many factors: the age and socioeconomic status of the patients, the type and severity of disorder and intraoral situation. Esthetic restoration of anterior teeth has been achieved with complete crowns, porcelain laminate veneers and acid- etched composite resin restorations. Dental enamel defects have been associated with a broad spectrum of etiologies including genetic and epigenetic factors such as systemic, local and environmental factors [5]. Systemic conditions such as perinatal or prenatal illnesses, low birth weight, regular antibiotic consumptions, malnutrition, celiac disease and respiratory disorders like asthma are associated with enamel defects [5].A rare case of enamel hypoplasia of epigenetic origin and clinical management for the same is presented in this case report.

CASE REPORT

A 15 year old girl reported to the Department of Pedodontics and Preventive Dentistry with a chief complaint of discoloured anterior teeth and pain in both lower posterior regions (Figure 1). She had difficulty in chewing and displeasure with her present dental appearance. Patient’s past medical history

revealed that she was asthmatic when she was three years old for which she was under medication till the age of five years. She was given asthalin 0.1mg/kg of body weight per day. Currently she is not under any treatment for bronchial asthma. Intraoral examination revealed generalized dirty yellow discolouration along with multiple carious posterior teeth because of the soft nature of enamel. Carious lesions were seen in tooth numbered 36, 37, 46, 47 (Federation Dentaire Internationale [FDI] system). Rough surfaced brownish discoloured 16,26,36,46,11,13,21,31,32,33,41,42,43 teeth were present. (System for notation of teeth used is F.D.I). Generalized attrition, loss of cusp pattern with square crowns was seen (Figure 2). Occlusal enamel was lost and thin enamel was seen on proximal surfaces. Cusp pattern of all posterior teeth were disturbed. The thickness of enamel was reduced on the teeth and was completely chipped off from some teeth exposing the dentin. The surfaces of the teeth were rough. The teeth, in general, exhibited a yellowish brown discolouration, with diffuse pitting present on the exposed tooth surfaces, more prominent on the labial and buccal aspects. No open bite was present.

Figure 1: Intraoral view showing discoloured anterior teeth

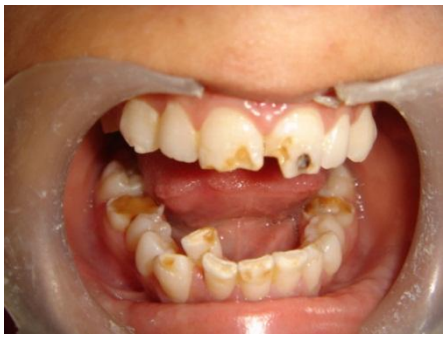


Figure 2: Intraoral view showing generalized attrition, loss of cusp pattern on posterior teeth

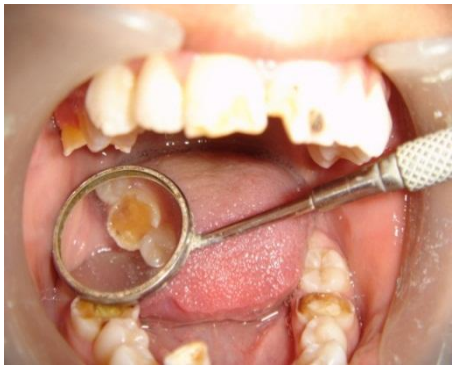


Figure 3: Photograph showing the discoloured anterior teeth restored with composite resin restoration

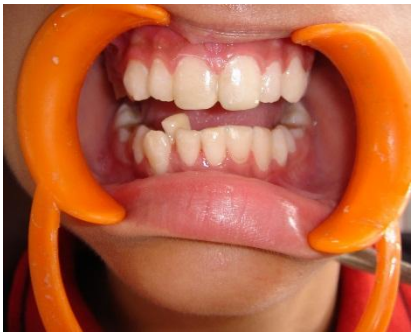


Figure 4: Photograph showing post-operative filling done with miracle mix after root canal treatment in lower permanent first molars (i.e. 36, 46) prior giving metal crowns

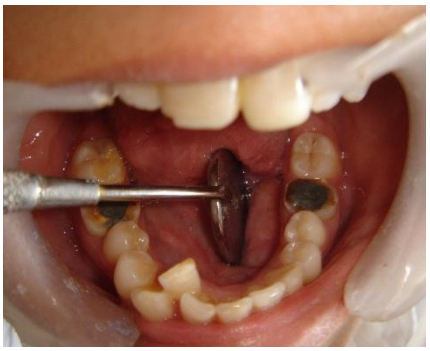
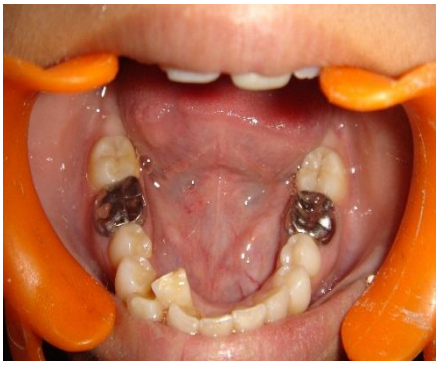


Figure 5: Intraoral view showing the metal crowns given after root canal treatment in the lower permanent first molars



The patient has no siblings and clinical examination of the parents revealed normal healthy teeth, which rules out any hereditary association. After complete diagnosis a multistage treatment protocol was formulated and executed.
Since esthetics was the concern, anterior teeth were restored with composite resin restorations (Figure 3). Root Canal Treatment was started in lower permanent first molars (i.e. 36, 46) and post-operative filling was done with miracle mix prior giving metal crowns (Figure 4). After the root canal treatment the teeth were replaced with metal crowns (Figure 5).The patient was recalled after 6-months interval.

DISCUSSION

Enamel hypoplasia is a developmental defect of enamel produced by a disturbance in the formation of the organic enamel matrix, clinically visible as pitting or grooves. Pitted type of enamel hypoplasia appears as a result of reduction in the amount of enamel matrix formation. This may be because of a primary defect in odontoblast or in ameloblast or may be a result of defective interaction between odontoblasts and ameloblast. Ameloblast are found to be in all stages of degeneration. Early changes are that there is an abnormal formation of an enamel like substance within or adjacent to the ameloblast, substance. In respiratory disorders such as asthma, ameloblast are highly sensitive to oxygen supply. Use of tooth paste containing peppermint can also cause shortness of breath and hence bronchospasm and further oxygen deprivation for the ameloblast.

Children with bronchial asthma demonstrate a higher prevalence of enamel hypoplasia than do non afflicted children [6]. The prevalence of dental enamel defects was found to be 11 times higher in permanent dentition amongst Brazilian pediatric patients with asthma [7,8]. Some authors observed positive correlation between respiratory disorders, such as asthma, and the presence of demarcated opacities in first permanent molars, while other authors have also suggested that asthma is associated with the occurrence of developmental defects of enamel in permanent teeth[9,10].

The treatment of dental problems of patients with EH presents an interesting challenge to dental surgeon. Management of patients with EH should start with early diagnosis to prevent restorative problems at a later stage. The esthetic treatment of EH is limited to the removal of surface stains, elimination of the defective tooth tissue, and masking of the defects. Many different materials and methods like adhesive techniques, porcelain-fused-to metal crowns and fixed partial dentures, full porcelain crowns and inlay/onlay restorations are used for the prosthodontic treatment. In our case, the esthetic treatment to the patient was given by composite resin restoration of the anterior teeth and the posterior teeth.

CONCLUSION

Enamel Hypoplasia is a very serious problem that can result in a compromised oral health. It causes physiological and psychological disturbances. Prompt treatment aims to relieve pain or tooth sensitivity, to maintain masticatory function and last but not the least to improve the appearance. Coordinated Orthodontic, Prosthodontic and restorative treatments with careful consideration of patient's expectations are critical for a successful outcome and achieving patient's satisfaction.

ACKNOWLEDGEMENTS

We are thankful to the patient and her family members who participated in this study.

REFERENCES

1. Suckling GW. Developmental defects of enamel-historical and present day perspectives of their pathogenesis. Adv Dent Res.1989; 3: 87–94.
2. FDI commission on Oral Health Research and Epidemiology. An epidemiological index of developmental defects of dental enamel (DDE Index). Intl Dent J 1982; 32: 159–67.
3. Ozturk N, Sari Z, Ozturk B. An interdisciplinary approach for restoring function and esthetic in patient with amelogenesis imperfecta and malocclusion: a clinical report. J Prosthet Dent 2004; 92: 112–5.
4. Neville B, DamM DD, Allen CM, Bouquot J. Oral and maxillofacial pathology. 3rd ed. Elsevier, 2009.
5. Rajendran R, Sivapathasundharam B. Shafer's textbook of oral pathology. 5th ed. Elsevier, 2007.

6. Pinkham J, Casamassimo P, McTtigue D, Fields H, Nowak A. Pediatric dentistry: Infancy through adolescence. 4th ed. St. Louis: Saunders (An imprint of Elsevier), 2005.
7. Guergolette RP, Dezan CC, Frossard WT, Ferreira FB, Cerci Neto A, Fernandes KB. Prevalence of developmental defects of enamel in children and adolescents with asthma. J Bras Pneumol 2009; 35: 293–4.
8. Jälevik B, Norén JG, Klingberg G, Barregård L. Etiologic factors influencing the prevalence of demarcated opacities in permanent first molars in a group of Swedish children. Eur J Oral Sci 2001; 109: 230–4.
9. van Amerongen WE, Kreulen CM. Cheese molars: a pilot study of the etiology of hypocalcifications in first permanent molars. ASDC J Dent Child 1995; 62: 266–9.
10. Narang A, Maguire A, Nunn JH, Bush A. Oral health and related factors in cystic fibrosis and other chronic respiratory disorders. Arch Dis Child 2003; 88: 702–07.

How to cite this article: Verma L, Sharma RK, Singh R. A rare case report of the clinical management of Enamel hypoplasia of epigenetic origin. J Res Med Den Sci 2014;2(2):67-70.

Source of Support: None
Conflict of Interest: None declared

Corresponding Author:

Dr. Leena Verma,
Senior Assistant Professor,
Department of Pedodontics,
Dr HSJ Institue of Dental Sciences and Research,
Panjab University, Chandigarh
Email: leenaverma32@rediffmail.com

Date of Submission: 28/05/2014
Date of Acceptance: 13/06/2014