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Case Report

A Rare Case of Circumferential Plane-Form Enamel Hypoplasia in Anterior Dentition: Ghobashy Enamel Defect

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Abstract

Introduction: This case report describes a rare and previously undocumented dental anomaly involving hypoplastic enamel that peels off from the incisal one-third of the upper central incisors, affecting all anterior teeth.
Case Presentation: The patient, a 27-year-old medically free male with no associated syndromes or family history of similar conditions, presented with this unique enamel defect. Clinical examination revealed uniform enamel peeling without pain or caries, and radiographic findings showed no abnormalities in the underlying dentin or pulp. Given the rarity of such type of enamel hypoplasia, this case was challenging in diagnosis and understanding the causes that led to such unique presentation. The patient was reassured and was offered the following treatment options, either conservative approaches such as composite build-up or more advanced restorative solutions such as ceramic crowns to restore aesthetics and function.
Conclusion: This report underscores the importance of recognizing rare dental anomalies and contributes valuable insights into the diagnosis and management of enamel defects.

Keywords: Enamel, Hypoplasia, Esthetics, Anterior Teeth.

Introduction

Enamel hypoplasia is a developmental defect characterized by inadequate enamel formation, often resulting from disruptions during the secretory phase of amelogenesis ***(Modrić et al., 2016).*** It can be manifested as pits, grooves, or generalized thinning of the enamel, and it is associated with various etiological factors, including genetic conditions, systemic illnesses, and environmental influences ***(Kanchan et al., 2015).*** While enamel hypoplasia is a well-documented phenomenon, certain presentations remain exceptionally rare and poorly understood.

One such rare presentation is circumferential enamel peeling, where the enamel detaches in a uniform, ring-like manner from the tooth surface. To date, this specific anomaly has not been reported in human patients, making it a significant addition to the dental literature. The absence of documented cases underscores the need for further research and awareness of such unique enamel defects.

The aim of this report is to document this rare presentation of such anomaly, discuss its clinical implications, and explore potential treatment options, thereby contributing to the understanding of enamel defects and their management.

Case Description

A 27-year-old medically free male presented for a routine dental examination. The patient reported a history of pneumonia during childhood, for which he underwent extensive medical treatment involving multiple medications. He denied any familial history of similar dental anomalies or syndromic conditions. The patient expressed concern about the unaesthetic appearance of his teeth but reported no pain, sensitivity, or functional issues.

His dental history revealed that his upper left first molar was congenitally missing, while the first molars in the other three quadrants had been extracted, with no history of trauma or other dental treatments. The patient had poor oral hygiene, with visible plaque accumulation and mild gingival inflammation, but no active caries or periodontal disease.

Clinical examination revealed a unique presentation of enamel defects primarily affecting the anterior dentition. In the **upper arch**, the central incisors exhibited **plane-form enamel hypoplasia**, with the enamel appearing to peel off in a uniform, circumferential manner from the incisal one-third **(Figures 1 and 2)**. The lateral incisors and canines showed incomplete enamel formation, characterized by notches along the incisal edges.

Similarly, in the **lower arch**, the central and lateral incisors displayed the same peeled-off enamel appearance, while the canines had incomplete enamel formation at the incisal edges **(Figure 3)**. Diffuse white patches, indicative of enamel hypomineralization, were observed on all teeth.

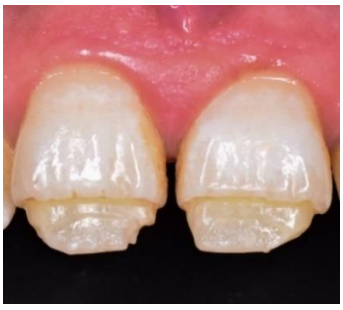

Figure 1: Upper central incisors showing plane-form enamel hypoplasia with circumferential peeling (labial view).

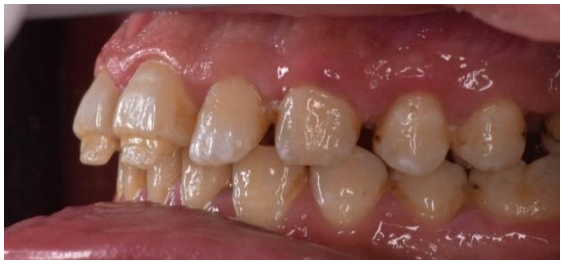

Figure 2: Upper central incisors showing peeled-off enamel appearance (lateral view).

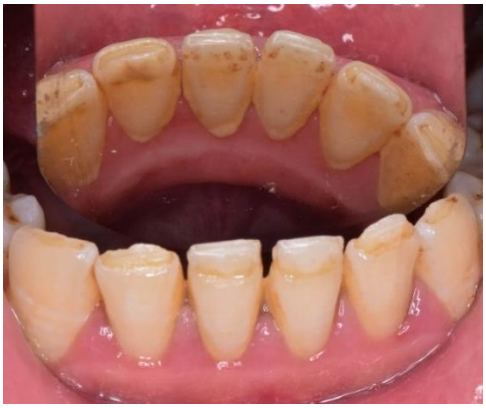

Figure 3: Lower anterior teeth showing peeled-off enamel appearance.

Radiographic examination **(Figure 4)** revealed normal dentin structure in the affected teeth, but the enamel appeared incomplete, with small dentin projections arising from the incisal edges. No root abnormalities or other dental anomalies were observed. The patient had a congenitally missing upper left first molar, while the first molars in the other three quadrants had been extracted, with no signs of retained roots or pathology.

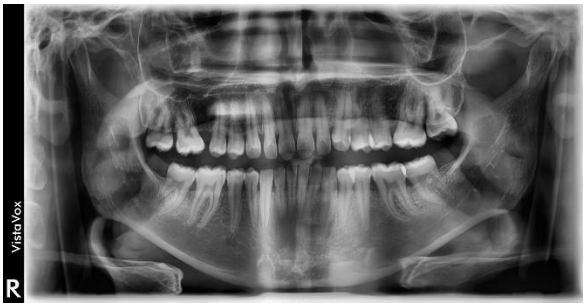

Figure 4: Panoramic radiograph showing missing first molars in all quadrants, along with small dentin projections in the anterior teeth.

A differential diagnosis included amelogenesis imperfecta and molar-incisor hypomineralization (MIH), but these were ruled out due to the absence of familial history and the unique circumferential

peeling pattern. Based on the clinical and radiographic findings, a diagnosis of plane-form enamel hypoplasia was made.

The patient was informed about the condition and offered cosmetic treatment options, including composite build-ups or laminate veneers, to improve the appearance of the affected teeth. However, the patient **declined cosmetic treatment**, citing personal preference. Emphasis was placed on improving oral hygiene and regular dental follow-ups to monitor the condition.

Discussion

Enamel is a hard dental structure covering the crowns of the teeth and it is responsible for the esthetics and the functionality of the teeth ***(Fitri and Kamizar, 2022)***. Enamel formation, also known as amelogenesis, involves (i) matrix formation, also known as the secretory stage, (ii) mineralization, and (iii) maturation ***(Fitri and Kamizar, 2022).*** Dental enamel is a unique structure and its uniqueness is derived from the fact that it is highly calcified and it cannot be repaired or remodeled after its initial formation, hence any disturbances that may occur during amelogenesis will be permanently etched on the tooth surface ***(Neville et al., 2023).***

Amelogenesis is an exceedingly organized process that when disturbed during any stage, would result in enamel defects that may be quantitative or qualitative in nature ***(Gupta et al., 2014; Disha et al., 2024).*** Enamel hypoplasia is a quantitative developmental disorder that usually results from disturbances occurring during the secretory stage ***(Gupta et al., 2014; Neville et al., 2023).*** The exact cause of enamel hypoplasia is still unknown, but a number of reasons have been implicated, whether hereditary, acquired or local causes ***(Rokade et al., 2023).***

A number of different types of enamel hypoplasia have been described and it ranges from pits to linear enamel, to plane-form enamel as seen in our case ***(Kanchan et al., 2015).*** To the best of our knowledge, very few cases of enamel-form hypoplasia have been reported and what has been reported are that of archaeological cases. Plane-form enamel hypoplasia (PFEH) was described by Hillson and Bond in 1997, owing it to Berten who categorized enamel defects in 1895 into 3 different categories, including plane-form defects. Ogden et al. (2007) explained extensive "plane-form" hypoplasia as an entire band of ameloblasts that failed to lay down matrix properly ***(Lewis M., 2018).*** In most instances, such defects can be extensive leading to exposure of the underlying dentin ***(Ogden et al., 2007)***, as encountered in our case.

The exact cause behind such defect is still unknown. Most of the anthropological studies reported that PFEH defects are linked to severe malnutrition, congenital syphilis, extensive medical treatments or localized trauma. Some authors have linked PFEH to dental fluorosis or some genetic conditions such as amelogenesis imperfecta ***(Towle et al., 2024)***. This was not in accordance to the anthropological study performed by Towle et al that did not find any link between amelogenesis imperfecta or dental fluorosis and PFEH ***(Towle et al., 2024)***. With respect to our case, the exact cause of PFEH could not be traced, but it might be related to the extensive medical treatment of pneumonia the patient underwent during childhood.

The treatment of enamel hypoplasia usually involves a method that restore the natural appearance of the teeth, since such defects usually result in reduced esthetics and do not affect the functions of the teeth. Such treatments usually range from enamel micro abrasion to composite buildups or veneers ***(Gupta et al., 2014)***. In our case, the patient expressed concern about the unesthetic appearance of his teeth. However, when he was reassured, the defect was explained to him and the available treatment options, he refused the treatment.

To the best of our knowledge, this distinctive presentation of circumferential plane-form enamel hypoplasia has not been previously documented in the literature, except in archaeological records. Given its unique clinical and radiographic features, we propose the term 'Ghobashy Enamel Defect' to classify this anomaly, thereby facilitating future identification and research.

Conclusion

Enamel hypoplasia is a developmental defect that resulted in decreased esthetic, which might affect the patient's wellbeing. It has different types of presentations ranging from pits to furrow defects. This case reports plane-form defect, which is a rare form of enamel hypoplasia that occurs due to failure of ameloblasts to secrete matrix, resulting in the absence of a band of enamel, exposing the underlying dentin.

Conflict of Interest:
The authors declare no conflict of interest.

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Ethics:
The study was conducted in accordance with the institutional ethical guidelines, and informed consent was obtained from the patient.

Data Availability:
Data will be available upon request.

CRediT statement:
Author 1: Data curation, Methodology, Conceptualization, Resources, Writing-original draft.

Author 2: Data curation, Methodology, Writing - review & editing.

Author 3: Data curation, Methodology, Project administration, Supervision, Investigation, Writing - review & editing

References

Knezović Zlatarić, D & Celebić, Asja & Modrić, V.E., Verzak, Ž. and Karlović, Z., 2016. Developmental deffects of enamel in children with intellectual disability. *Acta stomatologica Croatica: International journal of oral sciences and dental medicine*, *50*(1), pp.65-71.

Kanchan, T., Machado, M., Rao, A., Krishan, K. and Garg, A.K., 2015. Enamel hypoplasia and its role in identification of individuals: A review of literature. *Indian Journal of Dentistry*, *6*(2), p.99.

Fitri, M. and Kamizar, K., 2022, March. Esthetic Restoration of Enamel Hypoplasia: A Case Report. In *2nd Aceh International Dental Meeting 2021 (AIDEM 2021)* (pp. 51-54). Atlantis Press.

Neville, B.W., Damm, D.D., Allen, C.M. and Chi, A.C., 2023. *Oral and maxillofacial pathology-E-Book*. Elsevier Health Sciences.

Disha, V., Zaimi, M., Petrela, E. and Aliaj, F., 2024. An Investigation into the Prevalence of Enamel Hypoplasia in an Urban Area Based on the Types and Affected Teeth. *Children*, *11*(4), p.474.

Gupta, S.P., Shetty, P.P., Reddy, K. and Sancheti, P., 2014. Enamel Hypoplasia: A Case Report. *Journal of Advanced Oral Research*, *5*(1), pp.10-13.

Rokade, R., Kulkarni, A., Birangane, R.S., Lahane, S., Karkade, A. and Chitgupkar, J., 2023. Enamel Hypoplasia–A Clinical Review. *Dental Journal of Indira Gandhi Institute of Medical Sciences*, *2*(2), pp.109-115.

Kanchan, T., Machado, M., Rao, A., Krishan, K. and Garg, A.K., 2015. Enamel hypoplasia and its role in identification of individuals: A review of literature. *Indian Journal of Dentistry*, *6*(2), p.99.

Hillson, S. and Bond, S., 1997. Relationship of enamel hypoplasia to the pattern of tooth crown growth: a discussion. *American Journal of Physical Anthropology: The Official Publication of the American Association of Physical Anthropologists*, *104*(1), pp.89-103.

Ogden, A.R., Pinhasi, R. and White, W.J., 2007. Gross enamel hypoplasia in molars from subadults in a 16th–18th century London graveyard. *American Journal of Physical Anthropology: The Official Publication of the American Association of Physical Anthropologists*, *133*(3), pp.957-966.

Lewis, M., 2018. 'Dental disease, defects, and variations in dental morphology', in *Paleopathology of children*. Academic Press, pp. 67–89.

Towle, I., Loch, C., Martínez de Pinillos, M., Modesto-Mata, M. and Hlusko, L.J., 2024. Severe enamel defects in wild japanese macaques. *International Journal of Zoology*, *2024*(1), p.8445492.