



An Interdisciplinary Treatment Approach to Manage Molar Incisor Hypo-Mineralization (MIH), Non-Vital Immature Molar and Anterior Crowding in a Child

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Dr. Faleh Al-Othaibi

Director

Department of Academic Affairs & Training,
Armed Forces Hospital,
Jazan, Kingdom of Saudi Arabia**Dr. Syed Nahid Basheer,**

Assistant Professor,

Department of Restorative Dental Science,
College of Dentistry,
Jazan, Kingdom of Saudi Arabia.**Dr. Mohammed Zameer, MDS***(Corresponding Author)*

Pediatric Dentist

Sanjeevani Dental Clinic,
Raichur-584103, Karnataka, India**Dr. Syed Ali Peeran**

Prosthodontist,

Armed Forces Hospital,
Jazan, Kingdom of Saudi Arabia.drmohammedzameer@gmail.com

[Affiliated to: Karnataka State Dental Council, Bangalore, India]

Abstract:

Molar-Incisor-Hypomineralization(MIH) is a congenital defect of enamel mineralization with multi-factorial etiology. MIH-affected children present with complex and more severe treatment needs. Moreover, when the defect is present in the incisors, it causes the affected children psychological and social harm. We present here a case of 10yr old child describing the interdisciplinary treatment approach to manage MIH, non-vital immature molar and anterior crowding. It was found that MIH is a multi-factorial disease with unclear etiology. Identification of MIH was possible by recording appropriate medical history and through clinical examination. The child was in need of a complex dental care which has been successfully managed through interdisciplinary treatment approach considering all his clinical needs along with psychological and social characteristics.

Keywords: *MIH, MTA, Laser, 2by4 Appliance, Anterior Crowding, Composite Veneers***ARTICLE INFO** The paper received on: **05/06/2018** Accepted after review on: **10/07/2018** Published on: **24/09/2018**

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1. Introduction

The term molar-incisor-hypomineralization (MIH) was introduced in 2001 to describe the clinical appearance of enamel hypo-mineralization of systemic-origin affecting one or more permanent-first-molars(PFMs) that are associated frequently with affected incisors.^[1] MIH present with severe clinical consequences and management for affected children found to be challenging due to: 1) Sensitivity and rapid development of dental caries in

affected-PFMs; 2) Limited cooperation of a young child; 3) Difficulty in achieving anesthesia; and 4) Repeated marginal breakdown of restorations.^[2] Moreover, when the defect is present in incisors it showed to cause psychological and social harm.^[3]

Rapid development of dental caries in MIH affected teeth may consequently show expeditious pulpal involvement and necrosis. In children, this might present with severe clinical consequence like arrested root formation and immature apex.



Additionally, if there is a persistent deleterious habit causing anterior crowding may results in severe complexity in regard to their management. The present case report narrates an interdisciplinary treatment approach to manage MIH, non-vital immature molar and anterior crowding.

2. Case Presentation

A 10yr-old boy accompanied with mother was reported with chief complaint of pain in the left upper tooth since 4weeks and white-patches over crowded upper front teeth since their eruption. Medical history revealed after the age of 2, patient had suffered repeatedly with rhinitis and bronchitis. Habit history revealed nocturnal thumb-sucking-habit till the present age.

Clinical examination revealed deep dental caries in maxillary right first molar. The tooth showed tenderness on percussion and did not respond to sensibility testing. White cream non-transparent smooth demarcated opacities with distinct boundaries were found in the incisal half of maxillary central incisors. Maxillary left central incisor showed coronally suspended gingival architecture. Molar relationship was Angle's Class-I with ectopic-eruption of permanent maxillary left central incisor. An anterior open-bite was found due to persistent habit with respect to permanent maxillary right central & lateral incisors. Other findings were; atypical restoration with secondary caries on permanent mandibular right first molar, dental caries with respect to primary maxillary left first and second molars involving more than two-surfaces.(Figure 1)

Radiographic evaluation revealed deep pit communicating with pulp in permanent maxillary right first molar with blunderbuss canals, deep pit approaching the pulp on permanent mandibular right first molar. Based on the findings, the case was

diagnosed as molar incisor hypomineralization with non-vital immature permanent maxillary right first molar. (Figure 2)

3. Management

Two-consecutive stages were defined:

First-stage: 1) Preventive therapies; 2) Management of pain in non-vital immature tooth.

Second-Stage: 1) Parent-patient counseling for habit interception; 2) Restorative strategies; 3) Crowding correction; 4) Gingivoplasty on permanent maxillary left central incisor.

Preventive strategies were explained and implemented as recommended by EAPD guidance for MIH.^[4] It comprises; i) Brushing teeth using a desensitizing toothpaste with a fluoride level of 1000ppm on a soft tooth-brush. ii) Topical application of remineralization agent. iii) Application of a low concentration fluoride gel.

Pain management for non-vital immature tooth was done following the protocols of previous reports through root-canal-therapy with MTA-apexification.^[5] After 2years of follow up, the tooth was without any abnormal symptoms rather, there were signs of induction of root-end-closure with hard-tissue formation over MTA. (Figure 2)

Stage-II treatment commenced with habit-interception through tongue-crib appliance. (Figure 3) On delivery of appliance patient and parents were informed that there may be some discomfort as the child becomes accustomed to the appliance and deals with inability to suck digits. At the same time, patient was psychologically prepared and motivated for wearing the appliance to avoid development of deleterious effects. He responded positively and intercepted the habit in 4months.



Alignment of ectopic-incisors along with correction of anterior open bite was done using 2-by-4 appliance (Figure 4). It started with segmental 0.014-inch-NiTi-arch-wire from maxillary lateral to lateral to take advantage of the arch wire's extreme flexibility for alignment. Progression of wire was done according to the previously followed sequence via 0.016-NiTi, 0.016 stainless steel, and 0.018 stainless steel.^[6] Correction was achieved with the total active treatment time of 10months.

Gingiva on left central incisor was coronally suspended, demanding crown lengthening. Carbon dioxide laser was used for gingivoplasty and created the gingival margin to follow physiologic gingival contour as similar to the adjacent central incisor. (Figure 5)

Composite veneer was placed following to the intra-enamel preparation to provide optimal function, esthetics, retention, physiologic contour and longevity without compromising the strength of the remaining tooth structure. In the present case, nano-composites of appropriate shade were used to place the veneer. This approach has shown clinical success with no staining up to two-years post-treatment. (Figure 4)

4. Discussion

MIH is associated with putative prenatal, perinatal and neonatal factors in producing developmental defect of enamel. Medical history revealed in the presented case supports the conditions previously has been evident in association with the development of MIH.^[7] Interdisciplinary treatment approach has been described to manage MIH-affected teeth, to correct of orthodontic problems and enhance esthetics. Preventive-therapies through use of CPP-ACP-remineralizing agent and fluoride gel have been very helpful in remineralizing the enamel, simultaneously reducing

hypersensitivity in MIH-affected teeth. Esthetic correction through composite veneers has changed the patient's perception to have a high self-esteem.

Early interceptive treatment has shown to improve the lives of younger children.^[8] Tongue-crib-therapy has intercepted and protected from exertion of deleterious effects due to the persistent habit. 2by4-appliance, a versatile tool has corrected the crowded Incisors and simultaneously the open bite.

AAPD has recognized the use of laser as an alternative and complimentary method of providing soft-tissue dental procedures.^[9] Gingivoplasty for the presented case was carried out efficaciously using Co₂-laser. In our case, esthetic correction, habit-interception and orthodontic correction has built up a positive psychological attitude and the feeling of socially well-being in the individual.

5. Conclusion

MIH is a multi-factorial disease with unclear-etiology. Identification of MIH was possible by recording appropriate medical-history and through clinical-examination. The child was in need of complex-dental-care which has been successfully managed through interdisciplinary-treatment-approach considering all his clinical needs along with psychological and social characteristics.

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Figures & Legends:



Figure 1: Preoperative Images.

- a) Occlusal view showing Deep dental caries with respect to 16, Proximal caries with respect to 64,65 and Anterior Crowding.
- b) Occlusal view of Mandibular teeth showing atypical restoration with secondary caries with respect to 46

c,d,e) Intraoral Frontal and lateral view at occlusion showing anterior crowding and open bite.

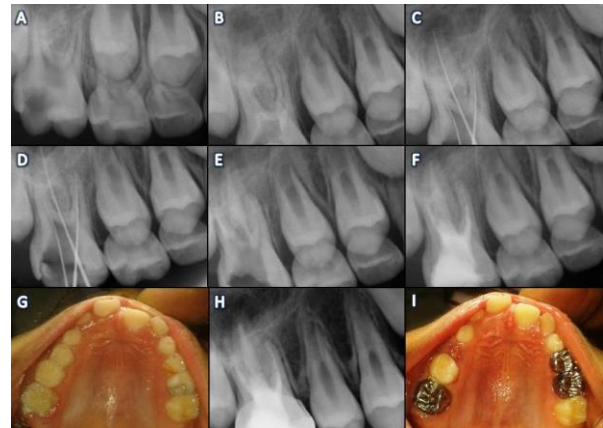


Figure 2: Management of Non-vital immature permanent molar.

- a,b) Preoperative periapical radiograph showing An immature permanent molar with deep dental caries involving the pulp.
- c,d) Working Length x-rays
- e) Post MTA Apexification radiograph
- f) Post obturation radiograph
- g) Post-endo Restoration using composite Resin
- h,i) Post Stainless steel crown Restoration

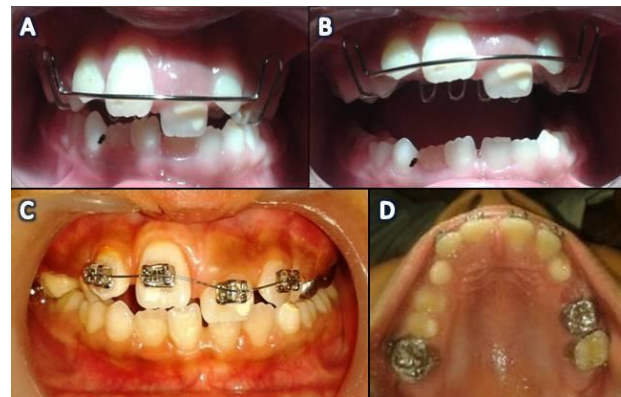


Figure 3: Orthodontic Management.

- a,b) Habit Interceptive approach through removable tongue crib appliance
- c,d) 2by4 appliance for correction of anterior crowding and open bite.

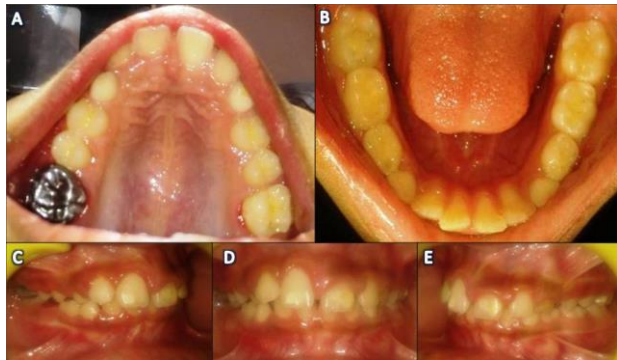


Figure 4: Post orthodontic images

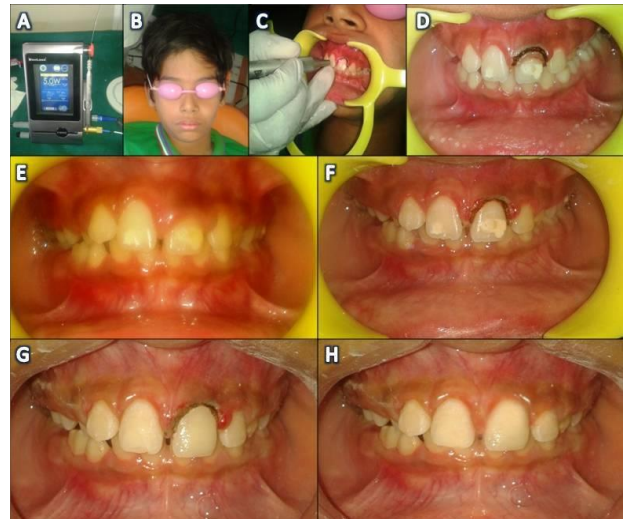


Figure 5: Gingivoplasty through Co2 Laser

- a) Co2 Laser Device
- b) Patient's Eye protection
- c,d) Application of Fibre optic cable and removal of gingival tissue
- e) Pre-operative condition
- f) Post-operative improvement
- g) Partial Composite Veneers on 11, 21
- h) Healing Post gingivoplasty