

CASE REPORT OLGU SUNUMU

DOI: 10.5336/dentalsci.2025-110823

Interdisciplinary Approach for Clinical Management of a Patient with Molar Incisor Hypomineralization

Molar İnsizör Hipomineralizasyonu Olan Bir Hastanın Klinik Yönetimine Disiplinler Arası Yaklaşım

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ABSTRACT Molar incisor hypomineralization (MIH), a limited enamel defect that increases vulnerability to dental caries, is characterized by opacities and post-eruption enamel degradation. It is crucial to diagnose MIH, understand its prognosis, effectively communicate treatment options to both the patient and parents, and adopt a collaborative treatment approach. This report describes the oral rehabilitation of a patient diagnosed with MIH using a multidisciplinary approach. During the treatment process, free gingival grafting and laser gingivectomy were applied to the mandibular anterior region where excessive loss of material was observed, followed by retreatment of failed root canal treatments and fibre post-core applications. As a result, the patient's desired aesthetics and function were achieved by zirconium fixed restorations.

Keywords: Molar-incisor hypomineralization;
fiber-post; laser gingivectomy;
free gingival graft, zirconia

ÖZET Diş çürüklerine karşı hassasiyeti artıran sınırlı bir mine defekti olan molar-insizör hipomineralizasyonu (MIH), opasiteler ve erüpsiyon sonrası mine bozulması ile karakterizedir. MIH'nin teşhisi, prognozunun anlaşılması, tedavi seçeneklerinin hem hastaya hem de ebeveynlerine etkili bir şekilde iletilmesi ve iş birliği bir tedavi yaklaşımının benimsenmesi çok önemlidir. Bu rapor, MIH teşhisi konulan bir hastanın multidisipliner bir yaklaşımla oral rehabilitasyonunu anlatmaktadır. Tedavi sürecinde, dişlerde aşırı madde kaybı görülen mandibular anterior bölgeye serbest dişeti grefti ve lazer ile gingivektomi uygulamalarını, başarısız kanal tedavilerinin yeniden yapılması ve fiber post-core uygulamaları izlemiştir. Sonuç olarak hastanın zirkonyum sabit restorasyonlar yapılarak hastaya istenilen estetik ve fonksiyon kazandırılmıştır.

Anahtar Kelimeler: Molar-insizör hipomineralizasyonu;
fiber-post; lazer gingivektomi;
serbest diş eti grefti; zirkonya

The term molar incisor hypomineralization (MIH) was introduced in 2001 to describe the clinical aspect of enamel hypomineralization affecting one or more 1st permanent molars and potentially associated with permanent incisors.¹ Currently, it is recognized that other permanent teeth, such as the 2nd premolars and canines, as well as certain deciduous teeth like the 2nd molars, may also be affected.² MIH

appears as cream-white or yellow to yellowish brown opacities on the affected teeth, with margins that are delimited, unlike adjacent normal.^{3,4}

MIH significantly affects a child's oral health-related quality of life due to its impact on tooth structure, aesthetics, and behavior.⁵ Porous enamel can easily fracture, especially under masticatory forces, leaving the dentin unprotected and increasing the risk

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Peer review under responsibility of Türkiye Klinikleri Journal of Dental Sciences.

Received: 28 Mar 2025

Received in revised form: 19 Jun 2025

Accepted: 02 Jul 2025

Available online: 04 Sep 2025

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of carious lesions.⁶ Additionally, teeth with MIH can be highly sensitive to temperature changes, both during brushing and even during the eruption.⁴

MIH's exact etiology remains unclear, but evidence suggests a multifactorial origin, with genetic factors and environmental influences, such as respiratory issues, infections, malnutrition, certain medications, and vitamin D levels during childhood, all playing a role.^{7,8}

The aim of this case report is to discuss the multidisciplinary management of a patient with multiple teeth affected by MIH.

CASE REPORT

A 20-year-old female patient presented to Gülhane Faculty of Dentistry with complaints of multiple carious teeth causing occasional pain. She had a history of mental retardation and epilepsy, for which she was receiving anti-epileptic treatment. No dental trauma was reported, but the crowns of all mandibular incisors, left mandibular premolars, and right maxillary 1st molar were completely destroyed, leaving only the roots. Radiographs revealed radiolucency in the apical area of the remaining 1st molar, absence of the right maxillary wisdom tooth, impacted wisdom teeth, and lesions at the root apex of root canal-treated mandibular incisors (Figure 1a, b). The patient was referred to the periodontology clinic after the extraction of teeth 16, 35, and 47, which could not be restored. Intraoral photographs were obtained for clinical documentation. Examination revealed yellowish-brown opacities with distinct and broad borders on the remaining dentition (Figure 2).

The MIH diagnosis was confirmed through clinical evaluation, patient history, symptoms, and the exhibited hypomineralization pattern. The preventive phase began with full-mouth scaling to remove plaque and calculus, followed by oral care instructions, including fluoride toothpaste. Fluoride varnish (Duraphat, Colgate Oral Care, Sydney, Australia; 2.26% F, 22,600 ppm F) was applied to all teeth post-periodontal treatment. Root canal treatments were re-treated, and new root canal treatments were performed on other necessary teeth (Figure 3). Once gingival inflammation resolved and oral hygiene was ensured, crown lengthening via pre-restorative gingivectomy was planned. Due to insufficient attached gingiva, a free gingival graft (FGG) was applied to the mandibular anterior region (Figure 4). Following FGG, gingivectomy was performed with Er-YAG laser (Lightwalker, Fotona, Ljubljana, Slovenia) with a wavelength of 2,940 nm, power 2 W, 200 mJ, 10 Hz, Water 4%, Air 4%, and pre-restoration preparations were completed (Figure 5).

A glass fiber post was placed in teeth 43, 42, 41, 31, 32, 33, and 34 with excessive material loss and completed root canal treatments. No percussion sensitivity was noted. Two-thirds of the canal filling was removed using a bur (Meisinger; Hager & Meisinger GmbH, Germany), and excess post length was trimmed with a round bur (Meisinger; Hager & Meisinger GmbH, Germany). The canal and post were etched with 37% phosphoric acid (Ivoclar Vivadent, Total Etch, Germany) for 30 and 15 seconds, respectively, then cleaned and dried. A bonding agent (Tokuyama Bond Force II, Tokyo, Japan) was ap-



FIGURE 1a: Pre-operative intra-oral radiographs



FIGURE 1b: Radiographic view showing deep carious lesions involving the 1st and 2nd molars, along with existing restorations



FIGURE 2: Intraoral appearance

plied and polymerized with UV radiation. A flowable composite (Clearfil Majesty Flow, Noritake, Japan) was introduced, and the post was set, then light-cured for 60 seconds (Figure 6).

Prior to prosthetic treatment, the patient's maxillary-mandibular relations were recorded using an intraoral scanner (Trios 4, 3Shape; Copenhagen, Denmark) (Figure 7). The upper and lower jaws were scanned separately. However, due to the no occlusal contact was detected during the occlusion registration process, the necessary records could not be obtained in the images (Video 1, Appendix 1, Appendix 2).

Orthodontic treatment was initially planned for the patient with severe malocclusion, but the patient's relatives declined fixed orthodontic treatment due to her systemic condition. Zirconia crowns were designed for teeth 11, 12, 13, 21, 22, 24, 31, 32, 33, 41, 42, and 43 (3Shape; Copenhagen, Denmark), while metal-supported fixed prostheses were fabricated for the posterior teeth. The patient's treatment, addressing functional, phonation, and aesthetic concerns, was successfully completed, achieving optimal aesthetic results (Figure 8). The treatment plan improved the patient's occlusion and preserved function and phonation. At the 6-month follow-up, the partial fixed prostheses remained intact, with no visible plaque accumulation.

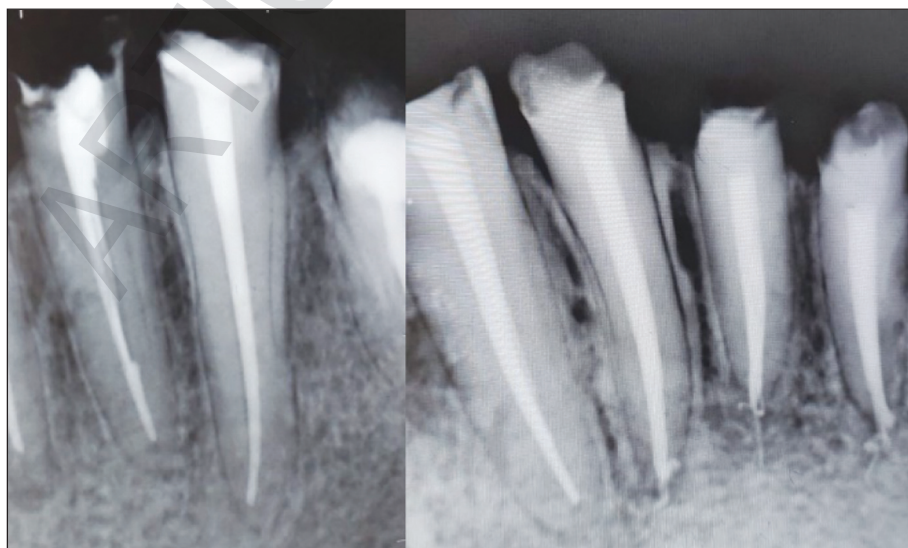


FIGURE 3: After root canal treatments



FIGURE 4: a) After FGG operation; b) Post-op 7th day; c) Post-op 14th day; d) Post-op 28th day; e) Post-op 3rd month



FIGURE 5: After laser crown lengthening

Written informed consent for all proposed clinical procedures and interventions was provided by the patient's legal guardian.

DISCUSSION

This case report discusses the multidisciplinary treatment of a patient diagnosed with MIH. To our knowledge, this is the first case in the literature where the width of the attached gingiva was increased with FGG prior to laser-assisted gingivectomy, followed by restorations with fiber posts and zirconia crowns.

Hypomineralization has been observed in both deciduous and permanent teeth for over 100,000 years, with renewed clinical interest in recent decades, especially as caries became preventable.⁸ Topical fluoride treatments enhance resistance to demineralization, reduce sensitivity, and aid remineralization, while casein phosphopeptide-amorphous calcium phosphate and biomimetic



FIGURE 6: After the application of the fiber post and the composite core buildup



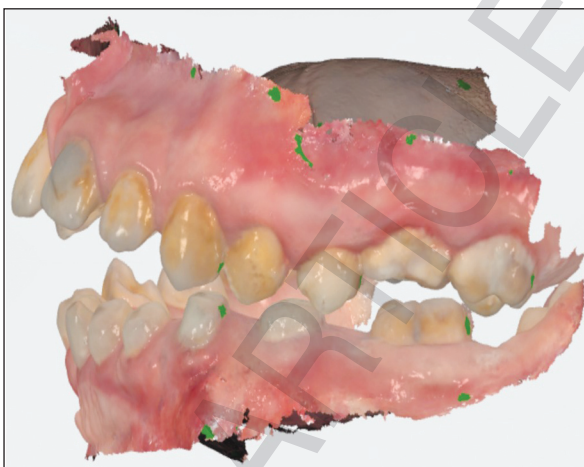
FIGURE 7: Intraoral scanner image showing maxillary-mandibular relationships



FIGURE 8: Intraoral appearance after restorations



APPENDIX 1: Right occlusion recording



APPENDIX 2: Left occlusion recording

hydroxyapatite have shown promising results.^{9,10} In our case, fluoride varnish was applied to the enamel to act as a fluoride reservoir.

Lasers can more readily cut, ablate, and sculpt the soft tissues with less bleeding and no suturing than a traditional scalpel. Other benefits of laser

surgery not seen with scalpel surgery include less scarring and wound contraction.¹¹ In this case, gingivectomy with Er-YAG laser provided bleeding control and patient comfort, and the required height for restorations was obtained.

An optimal post and core should improve crown retention, be biocompatible, and exhibit high tensile strength against occlusal and shear forces, while distributing stress evenly over the root surface and extending apically to at least the crown height or two-thirds of the root length.¹²⁻¹³ In endodontically treated teeth, materials with dentin-like physical properties, color, and aesthetics, such as glass fiber posts, are preferred.¹⁴ Glass fiber posts offer aesthetic benefits, improve light transmission, reduce root fracture risk, eliminate corrosion issues associated with metal posts, and can be easily removed for endodontic retreatment.^{14,15}

In conclusion, MIH requires a multidisciplinary treatment approach for effective rehabilitation. This case highlights the successful use of fiber posts, laser gingivectomy, free gingival grafts, and zirconia crowns in restoring both function and esthetics. Early diagnosis, clear communication with the patient and parents, and tailored treatment plans are key to achieving optimal outcomes in MIH management.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Özlem Saraç Atagün, Ülkü Tuğba Kalyoncuoğlu;
Design: Özlem Saraç Atagün, Bilge Ersöz; **Control/Supervi-**

sion: Özlem Saraç Atagün; **Data Collection and/or Processing:** Özlem Saraç Atagün, Nurullah Yurdakul, Asena Şeyma Karartı; **Analysis and/or Interpretation:** Bilge Ersöz; **Literature Review:** Ülkü Tuğba Kalyoncuoğlu, Özlem Saraç Atagün; **Writing the Article:** Özlem Saraç Atagün, Ülkü Tuğba Kalyoncuoğlu, Bilge Ersöz; **Critical Review:** Ülkü Tuğba Kalyoncuoğlu; **References and Fundings:** Özlem Saraç Atagün; **Materials:** Bilge Ersöz, Özlem Saraç Atagün, Nurullah Yurdakul.

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