CASE REPORT

# EVALUATION OF THE EFFECTIVENESS OF DIFFERENT RESTORATIVE APPROACHES IN PATIENTS WITH MOLAR INCISOR HYPOMINERALIZATION: A TWELVE-MONTH FOLLOW-UP

# AVALIAÇÃO DA EFICÁCIA DE DIFERENTES ABORDAGENS RESTAURADORAS EM PACIENTE COM HIPOMINERALIZAÇÃO MOLAR INCISIVO: UM ACOMPANHAMENTO DE DOZE MESES

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## ABSTRACT

Molar Incisor Hypomineralization (MIH) is a systemic enamel developmental defect characterized by enamel opacities affecting one or more permanent first molars, with or without the involvement of one or more incisors. The major challenge in restorative treatment is related to the adhesion of adhesive systems to the MIH-affected dental substrate. This study aims to report different approaches to restorative treatments that were adopted for teeth affected by MIH in the same patient. A 14-year-old male caucasian patient came to the Odontoclínica Central da Marinha (OCM, Marinha do Brasil, Rio de Janeiro, Brazil) with complaints of dental sensitivity and esthetics presented extensive opaque white, beige, and brown stain on the upper right incisor and upper right and left first molars. Both molars were previously restored and the left molar was infiltrated by caries. The rapid progression of this condition prompted the replacement of restorations, emphasizing the importance of continuous monitoring. Conservative direct composite resin restorations with intact enamel margins, as seen in upper right incisor, proved effective after 12 months of follow-up. Cavities, where the MIH lesion was not completely removed from the margin, had unsuccessful restorations and required re-intervention, with replacement of deficient restorations in upper right and left first molars after removal of affected enamel. This case highlights the importance of clinical knowledge and correct diagnosis of MIH lesions.

**Keywords:** MIH; Composite resin; Dental enamel; Enamel developmental defects; Dental enamel hypomineralization.

## RESUMO

A Hipomineralização Molar Incisivo (HMI) é um defeito do desenvolvimento do esmalte, de origem sistêmica, que se caracteriza pela presença de manchas no esmalte afetando um ou mais primeiros molares permanentes, com ou sem envolvimento de um ou de mais incisivos. O maior desafio no tratamento restaurador está relacionado à adesão dos sistemas adesivos ao substrato dentário afetado pela HMI. O objetivo deste estudo é relatar as diferentes abordagens de tratamentos restauradores que podem ser adotadas para dentes afetados pela HMI. Paciente jovem, com queixa de sensibilidade dentária e estética, apresentando os dentes 11, 26 e 36 com manchas opacas extensas, de cor branca, bege e marrom, sendo os dentes 26 e 36 previamente restaurados, e o dente 26 infiltrado por cárie. A rápida progressão desse quadro motivou a substituição das restaurações, reforçando a importância do monitoramento contínuo. Restaurações em resina composta direta, de forma conservadora, com bordas em esmalte sadio, como a do dente 11, mostraram-se eficientes após 12 meses de acompanhamento. Cavidades onde a lesão por HMI não foi totalmente removida da margem, tiveram restaurações malsucedidas e necessitaram reintervenção, com a realização da troca das restaurações deficientes dos dentes 26 e 36, após remoção do esmalte afetado. Este caso demonstrou a importância do conhecimento clínico e do diagnóstico correto das lesões por HMI.

**Palavras-chave:** HMI; Resina composta; Esmalte dentário; Defeitos de desenvolvimento do esmalte dentário; Hipomineralização do esmalte dentário.

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## INTRODUCTION

Molar Incisor Hypomineralization (MIH) is an enamel development defect of systemic origin characterized by enamel defects affecting one or more permanent molars, with or without the involvement of one or more incisors (1–3). The incidence of enamel defects affecting only one permanent molar is 24.3%, 26.8% for the first four permanent molars affected, and 42.1% of cases involving both permanent molars and incisors (4). The defect occurs during the mineralization of tooth enamel and can result in opacity on the tooth surface, with colors ranging from white/yellow to brown (2). The enamel shows a qualitative deficiency, becoming porous and with opaque stains, which facilitates the occurrence of post-eruptive fracture, hypersensitivity, plaque accumulation, and the progression of caries lesions (1,3,5–8). The exact etiology of MIH has not yet been fully clarified. Still, it may be associated with environmental factors that coincide with the period of maturation of the organic matrix of molar and incisor enamel, such as complications during childbirth, premature birth, low birth weight, jaundice, antibiotic use, ear and respiratory infections, high fever, hypoxia, inhaled asthma medication, vitamin D deficiency, as well as genetic factors that have been much debated by science (1,2,9–13).

Various treatments are described in the literature for teeth affected by MIH to improve signs, aesthetics, morphology, and function (9,14–17). A multidisciplinary approach may be necessary for prevention and intervention (9,14–17). The treatment choice depends on the severity of the condition in the affected tooth, the patient's age, the signs presented, and the aesthetic expectations (3,9,14–17). The earlier the diagnosis, the more effective the preventive measures will be, avoiding deleterious consequences such as the rapid progression of caries, pain, or invasive treatments (18). In addition to conservative preventive treatments, such as caries prevention and tooth remineralization, other minimally invasive treatments can be considered, such as enamel micro-abrasion and low-viscosity resin infiltration, or invasive treatments such as direct glass ionomer cement or composite resin restorations and indirect composite resin, ceramic or metal restorations, as well as the possibility of tooth extraction (9,14–17).

The greatest challenge in the restorative treatment of this condition is related to the bonding of adhesive systems to the dental substrate affected by MIH (19). The increased porosity of enamel results in a reduction in its hardness and elasticity (3). In addition, the disorganization of hydroxyapatite crystals, decreased mineral content, and increased protein content contribute to unfavorable adhesion (20). The different types of adhesive systems available so far, whether self-etch or total-etch, have not yet demonstrated adequate adhesion to affected enamel (21,22). The dentin below the affected enamel exhibits lower mineral density and increased interglobular or hypomineralized dentin. However, adhesion to this tissue is not impaired (19). Scientific literature suggests removing the enamel affected by MIH to maximize adhesion, leaving the restoration margins in healthy enamel (19,23).

In this context, this case report aims to describe the different treatment approaches for MIH at different stages, ranging from conservative composite resin restorations, including proservation and 12-month longitudinal follow-up, to the need for reintervention through direct and indirect restorations.

## CASE REPORT

A 14-year-old male caucasian patient with no systemic health problems came to the Odontoclínica Central da Marinha (OCM, Marinha do Brasil, Rio de Janeiro, Brazil), accompanied by his guardian, for evaluation of the upper left first molar due to extensive restoration and sensitivity. During the clinical examination, an orthodontic band covering the tooth was identified, along with beige and brown stains and a composite resin restoration infiltrated by caries (figure 1-D). The patient reported sensitivity to cold, and during chewing, an orthodontic band was fitted a few years ago to prevent a tooth fracture. Other teeth with stains were evaluated, such as upper right incisor, upper right first molar, lower right and left first molars, lower left and right lateral incisor (figure 1-B, C, E, F). The upper right incisor had a localized beige, yellow, and brown stain on the buccal surface, causing aesthetic dissatisfaction for the patient, who avoided smiling, affecting his quality of life (figures 1-A and B). Although there were other affected teeth, the upper left first molar and the upper right incisor were the most compromised, whether due to the extent of the restoration, sensitivity, or aesthetic reasons.

During the anamnesis, the person in charge reported that the patient's mother had pre-eclampsia during pregnancy, which resulted in a premature birth and the baby being kept in an incubator for two days. During early childhood, the patient had frequent episodes of fever due to respiratory infections, leading to frequent use of antibiotics. The diagnosis of MIH was confirmed based on the medical history and clinical analysis.

Initially, intraoral and extraoral photographs, digital periapical radiographs, and transillumination of the upper right incisor were taken using the Valo® light-curing device (Ultradent, Utah, United States). The treatment plan proposed a direct composite

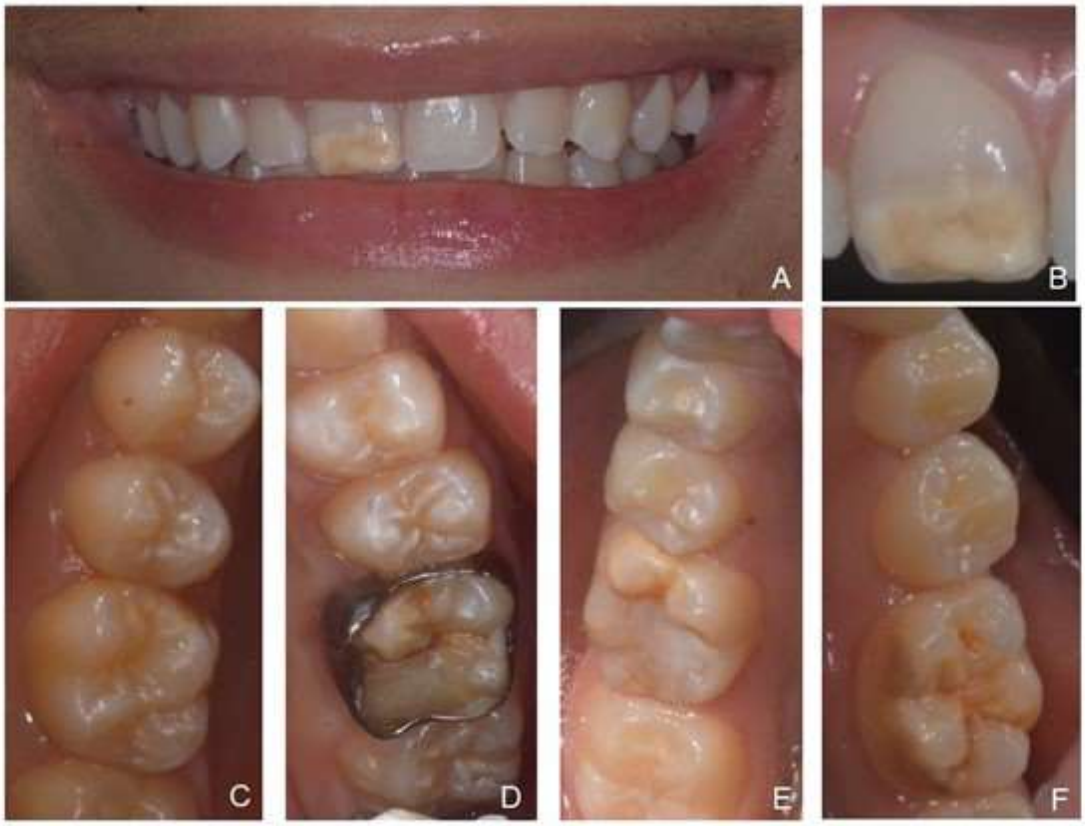


**Figure 1.** *A) Patient's smile. B) Close-up view of upper right incisor, showing an opaque beige, yellow, and brown stain. C) Upper right molar. D) Upper left molar surrounded by a metal band, with composite resin restoration and beige and brown opaque stains. E) Lower left molar with satisfactory composite resin restoration. F) Lower right molar showing beige and brown opaque stains.*

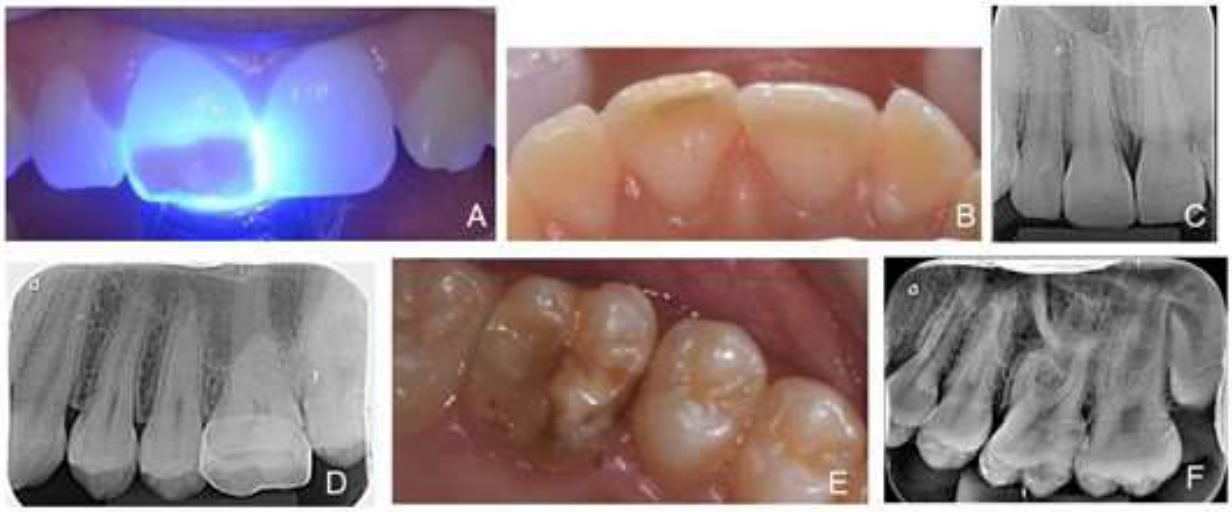


**Figure 2:** *Clinical and radiographic evaluation. A) Transillumination of upper right incisor using Valo® light-curing unit; B) Palatal view of upper right incisor, showing the opaque beige stain also in this region; C) Radiograph of upper right incisor. D) Radiograph of tooth upper left molar before removal of the metal band; E) Upper left molar with extensive composite resin restoration infiltrated by caries, presence of beige and brown opaque stains, after removal of the metal band. F) Radiograph of upper left molar after removal of the metal band.*

resin restoration for this tooth, considering the patient's age and expectations and the severity of the MIH lesion observed using transillumination (figure 2-A). For the upper left first molar, the proposal included the removal of the orthodontic band, the infiltrated restoration, and the selective removal of caries, followed by direct restoration in composite resin (figure 2-D, E, F). The other teeth would be preserved, with special attention to the lower left first molar (figure 1-E), and reassessed after 12 months.

The legal caregiver signed the Informed Consent Form (ICF), and the patient signed the Assent Form. After completing the treatment, the case report was submitted to the Research Ethics Committee of the Marcílio Dias Naval Hospital and approved with a protocol number 6.808.155.

The composite resin colors for the upper right incisor were selected employing small increments light-cured with the Valo® device on the tooth surface of the homologous tooth, providing greater predictability. Forma® resins (Ultradent, Utah, United States) in shades A2D and Incisal, as well as Z350XT® (3M ESPE, Minnesota, United States) in shade A2E, were chosen for the procedure (figure 3-B).

The upper right incisor was prepared by removing the enamel affected by MIH so that the edges of the restoration were in healthy tissue (6,24). Dental diamond burs (References 1014 and 4138, KG Sorensen, São Paulo, Brazil) were used for tooth preparation. Rubber dam was then performed (figure 3-D), followed by asepsis of the preparation with a Robinson brush (Microdont, São Paulo, Brazil) and 2% chlorhexidine gluconate paste Consepsis Scrub (Ultradent, Utah, United States) (figure 3-E). In the restorative procedure, total acid etching was carried out with 37% phosphoric acid Ultra-Etch (Ultradent, Utah, United States) for 30 seconds on enamel and 15 seconds on dentin (figure 3-F), followed by rinsing with water and drying. The Adper® Scotchbond® Multipurpose adhesive system (3M ESPE, Minnesota, United States) was used for the adhesive layer, according to the manufacturer's instructions, and light-cured with the Valo® device for 20 seconds. Insertion of the composite resin began with colors A2D and A1B Forma®, 0.9mm thick (figure 3-H), to simulate dentin and mask the unremoved opaque stain. The WE shade of Palfique® XL5 resin was used to simulate tooth enamel on the proximal and buccal sides, with a thickness of 0.3 mm. At the end of the restoration, the initial finishing was done with fine and extra fine-grained diamond burs (References 3195 F and FF, KG Sorensen) (figure 3-I).

Subsequently, the orthodontic band was removed from the upper left first molar (figure 2-E), followed by a new digital periapical radiograph (figure 2-F), enabling a better assessment of the extent of the caries lesion below the restoration. Infiltrative anesthesia was performed with a tube of 2% Lidocaine with 1:100000 adrenaline - Alphacaine. The deficient restoration was removed with a spherical diamond bur at high speed (Reference 1014, KG Sorensen) and selective caries removal with a spherical carbide drill (Reference nº5, KG Sorensen) at low speed. During the removal of decayed tissue, pulp exposure occurred, and a pulpectomy was performed. The patient was referred to the Endodontics Clinic (OCM, Marinha do Brasil, RJ), where the endodontic treatment was completed in a single session (figure 4-B). To continue treatment at the Restorative Dentistry Clinic, the provisional restoration was removed with a spherical diamond bur at high speed (Reference 1014, KG Sorensen) (figure 4-C), followed by rubber dam. The palatal and distal walls, which were weakened, were included in the cavity preparation, as was the tissue affected by MIH. The Omni-matrix® metal matrix (Ultradent, Utah, USA) was adapted to shape the restoration, followed by total acid etching with 37% phosphoric acid Ultra-Etch, rinsing with water, and drying. The adhesive layer was applied using the Adper® Scotchbond® Multiuso adhesive system, as indicated by the manufacturer.


**Figure 3.** *Direct composite resin restoration of upper right incisor. A) Initial state of the tooth; B) Shade matching on upper left incisor using small increments of light-cured composite resin on the tooth surface, without the use of adhesive system; C) 6mm wide metal matrix positioned to start preparation with burs on upper right incisor; D) upper right incisor after preparation with burs with partial removal of the lesion by HMI, and installation of rubber dam isolation; E) Preparation prophylaxis; F) Polyester matrix positioned to protect neighboring teeth during phosphoric acid application; G) Application of adhesive system with microbrush; H) After application and light-curing of the dentin layer of composite resin; I) Final aspect of the restoration on upper right incisor.*

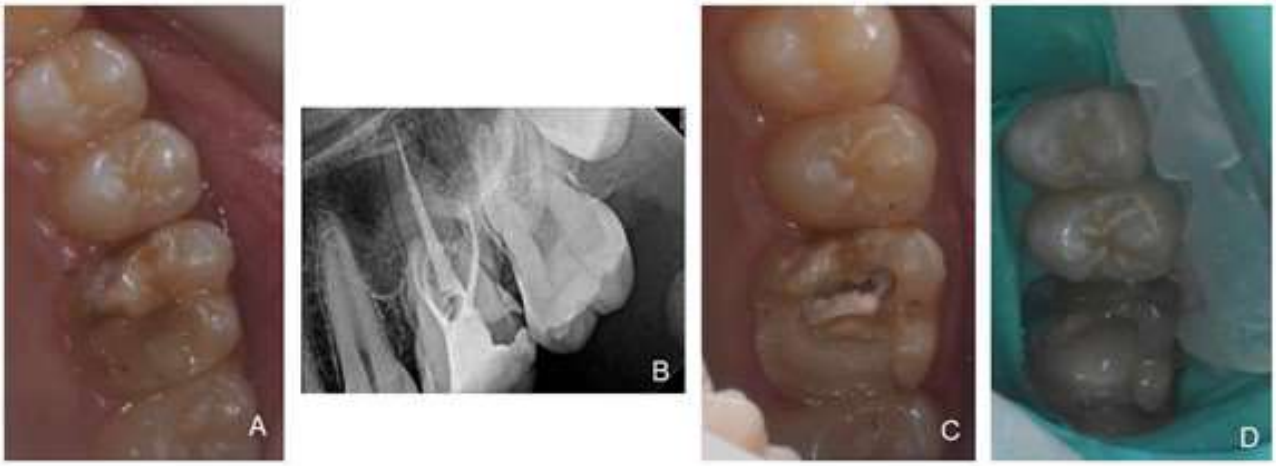


**Figure 4.** *Composite resin restoration of the upper left first molar. A) Initial state of the upper left first molar after removal of the metal band; B) Radiograph after endodontic treatment; C) After endodontic treatment, removal of temporary restoration and cavity preparation-with burs; D) The upper left first molar with rubber dam isolation and metal matrix to shape the walls, during restorative procedure.*

and light-cured with the Valo® device for 20 seconds. In the restoration, the palatal, distal, and occlusal walls were reconstructed with Forma® composite resin in A3E color, simulating tooth enamel, with a thickness of approximately 1mm (figure 4-D). For the dentin portion, Flow Opallis color A2 (FGM, Santa Catarina, Brazil) composite resins were used to seal the entrance to the ducts, and Bulk Fill Opallis color A3 (FGM, Santa Catarina, Brazil). Each increment was light-cured with a Valo® appliance according to the manufacturer's instructions. After removing the rubber dam, occlusal adjustment was carried out, followed by occlusal and proximal finishing.

Both restorations were finished using Sof-Lex® polishing strips and a Sof-Lex® Pop-on abrasive disk (3M ESPE, Minnesota, USA). Polishing was achieved using abrasive rubber tips impregnated with Jiffy® silica (Ultradent, Utah, USA), Diamond felt discs, Diamond AC I and II polishing paste (FGM, Santa Catarina, Brazil), and a goat hair brush for the contra-angle (American Burrs, USA).

After completing the restorative procedures on teeth upper right incisor and upper left incisor, significant improvements in smile aesthetics and masticatory function were achieved. The aesthetic impact of upper right incisor was remarkable for the patient and his guardian, who expressed great satisfaction with their new smile. Besides, the restoration of upper left molar contributed to a significant improvement in masticatory function with a reduction in sensitivity.

During the follow-up appointment, which took place 12 months after the procedure, the color, shape, and marginal integrity of the direct composite resin restoration in element upper right incisor were maintained (figure 5-A). However, upper left molar showed marginal maladaptation on the distal face, with no obvious caries activity (figure 5-C), as confirmed by digital periapical radiography (figure 5-B) and clinical evaluation with an exploratory probe, and an indirect restoration was indicated. Of the elements initially indicated for follow-up, only lower left molar, also affected by MIH, required restoration replacement due to the fracture associated with the adjacent caries lesion (Figures 5-D and E).

In upper left molar, the pre-existing restoration was partially removed, and an overlay preparation was made using dental diamond burs (Reference 4138, 4138F, 3131, and 3131F, KG Sorensen) (figure 6-A). The preparation was finished with a Soft-Lex® Pop-on finishing disc in red and orange, followed by abrasive rubber tips silica impregnated Jiffy in green and yellow. Next, retractor wire #00 Ultrapak (Ultradent, Utah, United States) was inserted and scanned with the CEREC Omnicam intraoral scanner (Dentsply Sirona, Charlotte, United States). The indirect restoration was designed using CEREC 4.1 software (Dentsply Sirona, Charlotte, USA) on the virtual model and milled using the InLab MC XL milling machine (Dentsply Sirona, Bensheim, Germany) in a CEREC Blocs C PC 14 polychromatic feldspathic ceramic block (Dentsply Sirona, Charlotte, USA) in color A3. After testing the indirect restoration, the prosthetic restoration was prepared for resin cementation. 10% hydrofluoric acid Condac porcelain (FGM, Santa Catarina, Brazil) was applied for 2 minutes, rinsed with air and water jet, and dried with air jet. Prosil silane (FGM, Santa Catarina, Brazil) was applied to the inside of the piece and volatilized with air jets after 1 minute. The tooth was relatively isolated using a dental sucker, cotton rollers, and Teflon tape, rinsed with a jet of air

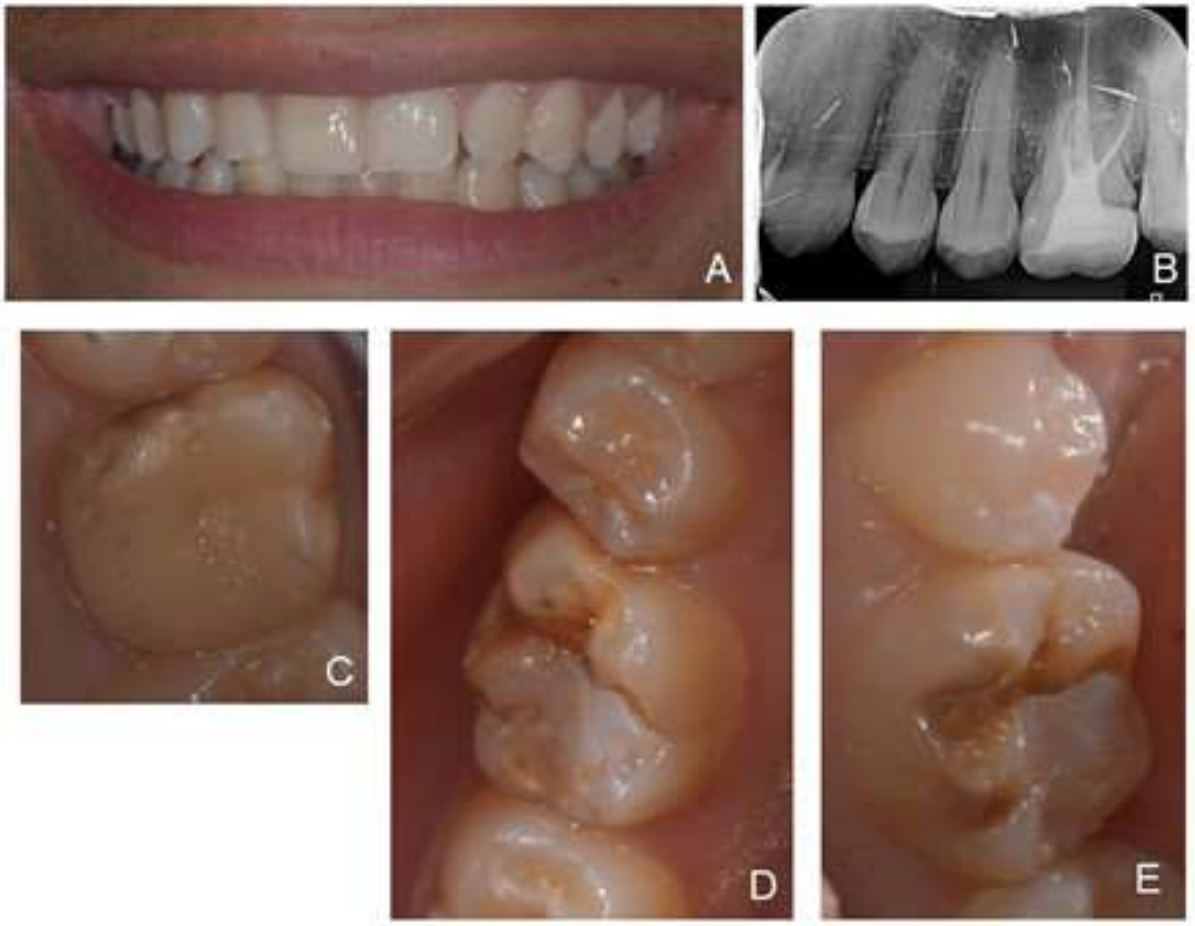


**Figure 5.** *Reevaluation after 12 months of initial treatment. A) Patient's smile showing upper right incisor restoration in excellent condition; B) Radiograph of upper left molar, where misfit is observed on the distal aspect of the composite resin restoration; C) Clinical aspect of upper left molar; D and E) lower left molar in occlusal-lingual and vestibular views, respectively. Fracture of restoration edges and caries infiltration are observed.*

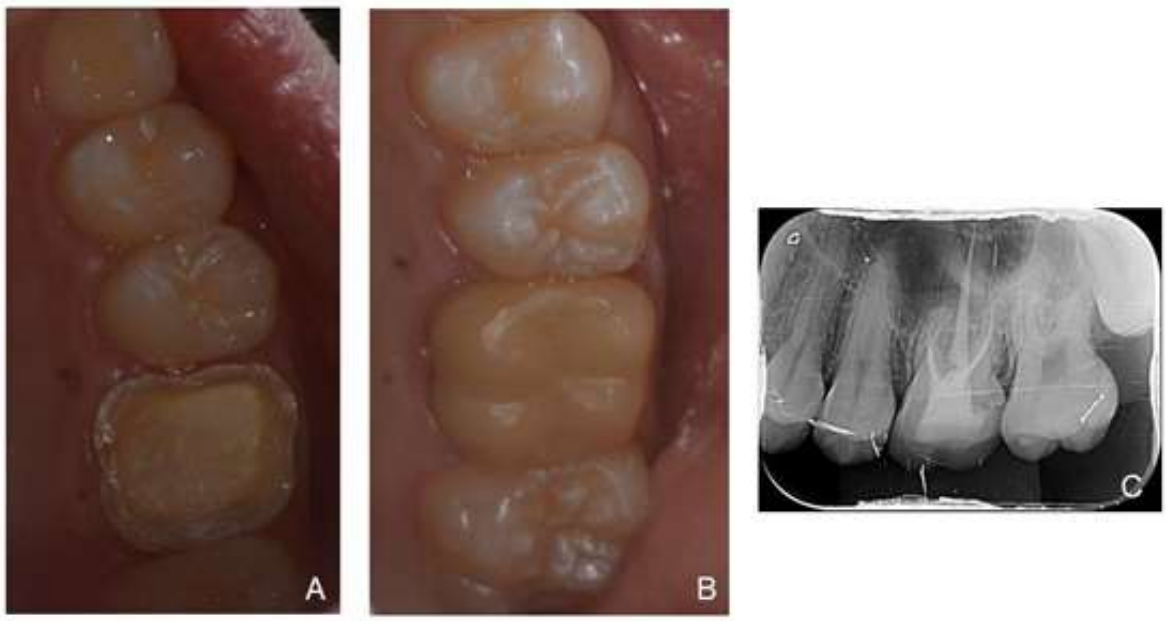


**Figure 6.** *Ceramic indirect restoration of upper left molar. A) Partial removal of misfit composite resin restoration and preparation for ceramic crown; B) Final aspect of cemented ceramic crown; C) Radiographic aspect after cementation of ceramic crown.*

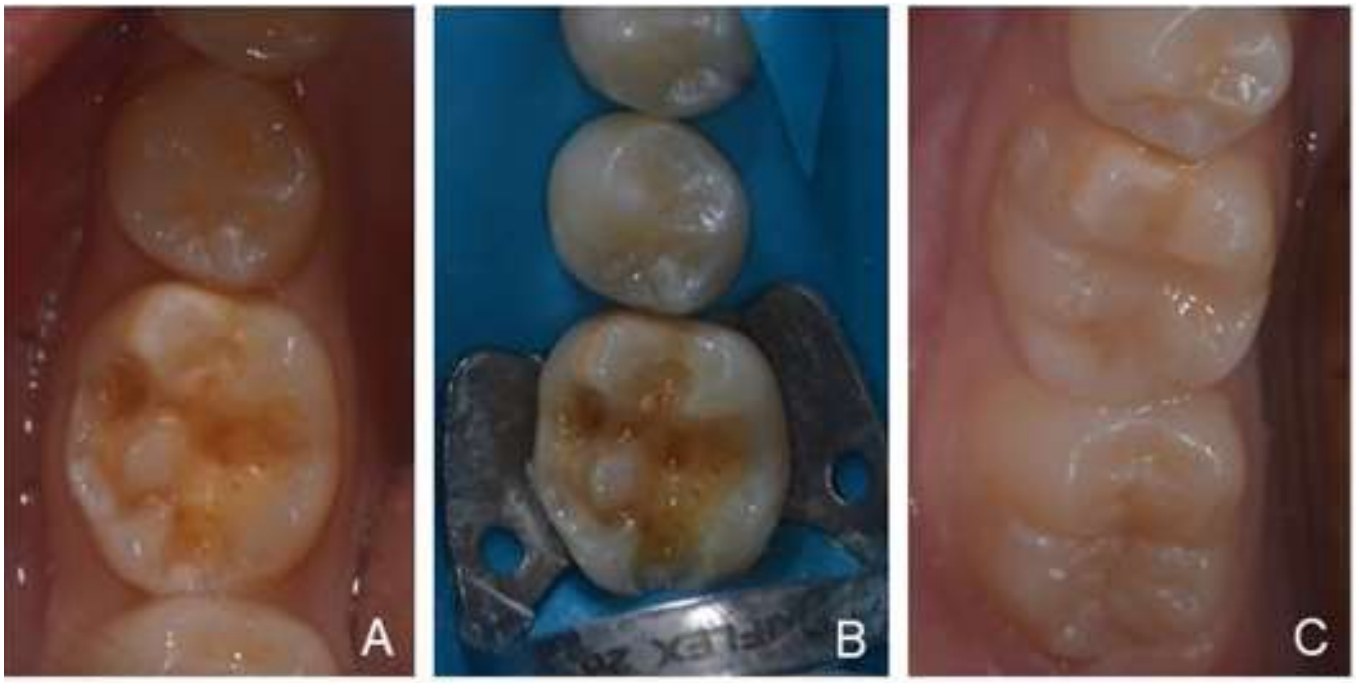


**Figure 7.** *Restoration of lower left molar. A) After removal of fractured restoration, caries lesion, and tissue affected by HMI; B) Rubber dam isolation installed and application of adhesive system; C) Clinical aspect of completed restoration on lower left molar.*

and water, and jets of air. Silane was then applied to the core filling area, followed by cementation of the indirect restoration with RelyX U200 dual-curing self-adhesive cement (3M ESPE, Minnesota, United States) in shade OA3. The cement was photoactivated for 1 minute on each side using the Gran Valo® photoactivator (Ultradent, Utah, United States). Subsequently, the relative isolation and marginal excesses of resin cement were removed using finely tapered diamond tips (Reference 2200F, KG Sorensen), a abrasive strip Microcut (TDV, Paraná, Brazil), and a #12 scalpel blade. Occlusal adjustment, finishing, and polishing were carried out with sequential rubber abrasive tips impregnated with silicon carbide (DhPro, Paraná, Brazil), followed by the final radiograph (Figures 6-B and C). Despite the difference in the color of the indirect restoration compared to the other teeth, the patient was satisfied with the prosthetic crown installed.

The infiltrated restoration of lower left molar was removed with a spherical diamond bur (Reference 1014, KG Sorensen), as well as the decayed tissue, using a spherical drill at low speed (Reference nº4 and 5, KG Sorensen). The area of enamel and dentin affected by MIH was also removed so that the edges of the cavity preparation remained in healthy tissue (figure 7-A). After rubber dam, a polyester matrix was adapted, followed by a total acid attack with 37% phosphoric acid, washed with water, and dried. The Adper® Scotchbond® Multipurpose adhesive system was applied according to the manufacturer's instructions and light-cured with the Valo® device for 20 seconds (figure 7-B). In the restoration, the buccal, distal, and occlusal walls were reconstructed with Z350XT composite resin in color A1E, simulating tooth enamel with a thickness of approximately 1mm. The dentin was mimicked using Forma® composite resin in the color A2D, and each increment of resin was photoactivated for 20 seconds and then for a further 1 minute on each side. After removing the rubber dam, occlusal and proximal adjustment was carried out, followed by finishing with abrasive rubber tips silica impregnated Jiffy in green, yellow, and white, followed by the silicon carbide brush Ultra-Brush (American Burrs, United States) (figure 7-C).

## DISCUSSION

This case report describes the restorative treatment of teeth affected by MIH using direct and indirect adhesive restorations. After removal of the restoration, enamel affected by MIH, and decayed tissue, endodontic treatment was required on upper left molar. The initial decision was to use direct composite resin restoration techniques on this tooth and on teeth upper right incisor and lower left molar to achieve a more conservative treatment. However, due to the difficulty in adhering to the tissue affected by MIH, adhesive failure was observed on the distal proximal face of the restoration on upper left molar. Given this circumstance, we opted for indirect restoration in the reintervention after removing the area of enamel affected by MIH, given the extensive loss of structure. In the case of lower left molar, which initially had a satisfactory composite resin

restoration, there was an unfavorable evolution marked by fracture of the restoration associated with a caries lesion. Teeth affected by MIH are more prone to post-eruptive fracture, facilitated caries lesion progression (3,5), and unfavorable enamel bonding (19,20). These conditions progressed rapidly in upper left molar and lower left molar, culminating in the need to replace the composite resin restorations in these teeth after 12 months of follow-up.

The earlier the diagnosis of MIH, ideally around the age of 8, when the first molars and permanent incisors are fully erupted, the better the prognosis for teeth affected by these developmental defects of the enamel (1,2,18). At this stage, it becomes feasible to implement preventive measures that contribute to the maintenance of the affected tooth using minimally invasive techniques. These measures include the use of fluoridated toothpaste, dietary counseling, scheduled and frequent follow-up visits to the dentist, the use of orthodontic bands to prevent tooth fracture, and direct composite resin restorations in the event of a carious cavity (9,15–17). In the case of the current patient, the diagnosis of MIH had been established early on, allowing preventive and therapeutic measures to be implemented, such as restorations and the application of an orthodontic band. However, it is worth noting that frequent maintenance appointments were not carried out, which is important for the long-term success of the treatment (25).

The color change in tooth enamel, a characteristic of MIH, may indicate differences in the hardness and porosity of the tissue, with yellow/brown stains being more porous and more susceptible to fractures than white stains (24,26). Although there have been studies showing that yellow/brown changes are more fragile than other color changes, the level of scientific evidence about this association is low, and there is an opportunity to develop scientific studies to validate the need for follow-up visits at shorter intervals (24,27). As for the type of treatment, the color change and factors such as the patient's age, socioeconomic conditions, the severity of the lesion and symptoms, the patient's expectations, and the number of teeth affected play a crucial role (9,14,28). These multiple factors must be carefully considered when formulating the treatment plan, highlighting the complexity of the clinical approach for patients with MIH.

While the treatment of affected posterior teeth is more related to the prevention of hypersensitivity and progression of caries, anterior teeth are of greater psychosocial concern and affect the patient's smile, causing aesthetic dissatisfaction and reducing their quality of life (29,30). The patient reported that he had been bullied and, therefore, began to smile less and show his teeth less when he smiled due to the stain on the buccal surface of element upper right incisor. The patient reported his satisfaction with the composite resin restoration at the follow-up appointment 12 months after the procedure.

Hypersensitivity to thermal or mechanical stimuli, frequently reported by patients with MIH, can significantly impact their quality of life (31). This hypersensitivity may be associated with hypomineralized enamel, which, although apparently intact, does not prevent bacterial penetration, allowing microorganisms to reach the dentinal tubules and consequently cause subclinical chronic pulp inflammation (32,33). Clinically, during dental care, the anesthetic procedure can become challenging due to this inflammation (34). Another significant impact that can occur in patients with MIH associated with hypersensitivity is the difficulty in performing oral hygiene properly, further increasing susceptibility to the development of caries lesions (8). Even with several teeth affected to varying degrees, the patient reported altered sensitivity only on upper left molar and no difficulty with hygiene, which was clinically proven.

In anterior teeth, minimally invasive techniques for removing the superficial layer of enamel with color alteration, such as microabrasion, can be indicated (9,14,35). This approach effectively uses light and superficial stains, providing successful results (9,14,16,35). Microabrasion can be combined with tooth whitening for moderately or severely affected teeth (16,35). The extent of the stain can be assessed using a light-curing device on the palatal side of the affected tooth, as shown in Figure 2-A. When the light is activated, an internal shadow can be seen on the tooth, and the darker the shadow, the deeper the stain (9). In these cases, microabrasion is ineffective, so this procedure was not included in the treatment plan for the patient, who had deep stains, even affecting the palatal side of upper right incisor (Figure 2-B). For this reason, a direct restoration in composite resin was proposed.

Within the minimally invasive techniques for treating anterior and posterior teeth with different degrees of severity of MIH lesions, another option is resin infiltration with high-fluidity resins, such as Icon (DMG, Hamburg, Germany) (17,36,37). The infiltration of the material allows it to fill the pores and large intercrystalline spaces in the enamel, modifying its optical properties and thus making the stains less visible (38). In addition to this advantage, there is the possibility of mechanically strengthening the enamel structure (17). However, it is important to highlight the challenges associated with this approach. The cost of the material is identified as a significant

limitation to its widespread use. Moreover, in cases of deep stains, as seen in Figure 2-B, where the stain reaches the palatal side of the affected tooth, the technique may not be indicated, as it may not fill the entire hypomineralized region (39).

Teeth with MIH, whether or not associated with caries lesions, can be directly restored using composite resins, glass ionomer cement (GIC), and resin-modified glass ionomer cement (RMIC) (23). GIC and RMIC have been indicated for provisional approaches, especially in cases involving treatment in uncooperative children (40). However, GIC restorations associated with selective removal of decayed tissue have demonstrated an effective approach after 24 months of follow-up (41). RMIC also proved effective after seven years of follow-up in molar restorations (42). The RMIC is superior in the analysis of annual failure compared to the GIC (23).

Due to the changes in the morphological characteristics of enamel affected by MIH, the presence of porosities and voids in the microstructure can result in adhesive failures and fractures, with enamel adhered to the resin fragment, characterizing a cohesive failure of the enamel (19). Because of these conditions, composite resin restorations in this structure become more susceptible to staining, wear, marginal fractures, secondary caries lesions, and retention problems, thus requiring frequent maintenance (19). Due to the low stability of the different adhesive systems on the affected enamel, it has been recommended that the preparation be extended to the healthy tissue, ensuring proper adhesion and less bacterial invasion (9,14,19,22). This information is congruent with the case reported, as in the case of upper left molar on the distal face, where the enamel affected by MIH may have resulted in adhesive failure. The procedure was successful in the other restorations in which the affected enamel was removed from the cavity margins, keeping the edges of the composite resin restoration in contact with healthy enamel.

Adhesion does not negatively impact dentin below the affected enamel (19). The restorative protocols used are the same as for healthy dentin, as they ensure good retention and reduce hypersensitivity (19).

Indirect restorations with full or partial coverage, whether metal, resin, or ceramic, are the treatment of choice for posterior teeth with MIH that have fractured or teeth with severe impairment and great loss of structure, demonstrating good clinical success (14,23,28). Young patients with severe molar MIH can receive a metal band to prevent tooth loss, provide proximal and occlusal stability, and help control hypersensitivity (16). Ceramic restorations are indicated for patients with gingival maturity, and the CAD/CAM system greatly facilitates this process (14). Extensive restorative treatments on severely compromised teeth can result in higher costs and high lifetime financial costs for the patient (35). In the case of upper left molar, the choice of indirect restoration using the CAD/CAM system provided speed and an efficient restoration with good marginal adaptation and greater treatment stability.

Further studies are needed to clarify the etiology of MIH and to identify effective restorative procedures in which the affected enamel is not removed, thus preserving a greater amount of tooth structure. Although several treatments for teeth affected by MIH are described in the literature, it is important to note that longitudinal follow-up studies are scarce.

## CONCLUSION

This clinical case demonstrated the importance of early diagnosis and knowledge of the different clinical approaches to treating MIH lesions. The evolution of the condition prompted the replacement of the restorations, reinforcing the importance of continuous monitoring. Conservative direct composite resin restorations with healthy enamel edges proved effective after 12 months of follow-up. Cavities, where the MIH lesion was not completely removed from the margin, had unsuccessful restorations and required reintervention. This case highlights the complexity of restorative management of teeth affected by MIH, requiring personalized and adaptable approaches to the particularities presented by the patient.

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