Scholars Journal of Dental Sciences
Abbreviated Key Title: Sch J Dent Sci
ISSN 2394-4951 (Print) | ISSN 2394-496X (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Resin infiltration for Molar-Incisor Hypomineralization: A 35-Month Follow-up Case Report

Dr. H. Bendekiche Hanane[1*], Prof. Chafika Mehdid[2]

[1]Associate Professor (Class B), Faculty of Medicine, University of Algiers, Head of the Adult Conservative Dentistry Unit, Mustapha University Hospital, Algiers
[2]Professor, Faculty of Medicine, University of Algiers, Head of the Conservative and Esthetic Dentistry Department, Mustapha University Hospital, Algiers

DOI: https://doi.org/10.36347/sjds.2025.v12i10.003 | **Received:** 12.09.2025 | **Accepted:** 03.11.2025 | **Published:** 07.11.2025

***Corresponding author**: Dr. H. Bendekiche Hanane
Associate Professor (Class B), Faculty of Medicine, University of Algiers, Head of the Adult Conservative Dentistry Unit, Mustapha University Hospital, Algiers

Abstract **Case Report**

Molar-incisor hypomineralization (MIH) presents a therapeutic challenge in aesthetic dentistry, particularly in the management of white opacities that compromise smile harmony. This study demonstrates the efficacy of resin infiltration as a minimally invasive solution through a documented clinical case with a 35-month follow-up. The Icon® technique, applied following a standardized protocol, achieved complete masking of the lesions from the initial session, with maintained long-term results. This approach thus positions itself as an optimal alternative to conventional treatments, combining aesthetic excellence and tissue preservation. These findings confirm the essential role of resin infiltration in the management of MIH.

Keywords: White spots - Molar Incisor Hypomineralization - MIH - Resin infiltration.

INTRODUCTION

Molar-incisor hypomineralization (MIH) is defined as a developmental condition characterized by hypomineralization defects in the enamel of the first permanent molars, associated with permanent incisors [1].

In the literature, the defects have been linked to environmental changes, breastfeeding (dioxin in milk), respiratory diseases, and illnesses presenting with high fever [2].

The determining clinical features of MIH are demarcated opacities with clear and distinct borders from the adjacent enamel [1]. Clinically, opacities range from white to yellow/brown. Histologically, it involves a severe mineral deficit, and rapid progression to enamel breakdown can occur [3]. Enamel defects are often quite extensive and more frequent on the dental surfaces, which explains the greater aesthetic concerns [4].

To assess the severity of MIH and guide the therapeutic choice, several classifications exist, such as that of Mathu-Muju and Wright (2006), which distinguishes mild forms (white opacities without substance loss), moderate forms (yellow/brown opacities with surface alteration), and severe forms (with post-eruptive tissue destruction) [8].

Several techniques have been proposed to improve the appearance of MIH lesions [5]. The common treatment strategy includes restorative procedures and enhancing remineralization using products containing CPP-ACP or fluoride, microabrasion, and bleaching [6].

Currently, a resin infiltration technique has been introduced with the development of a highly fluid resinous material [7]. This minimally invasive technique is particularly indicated for masking Class I (mild) defects.

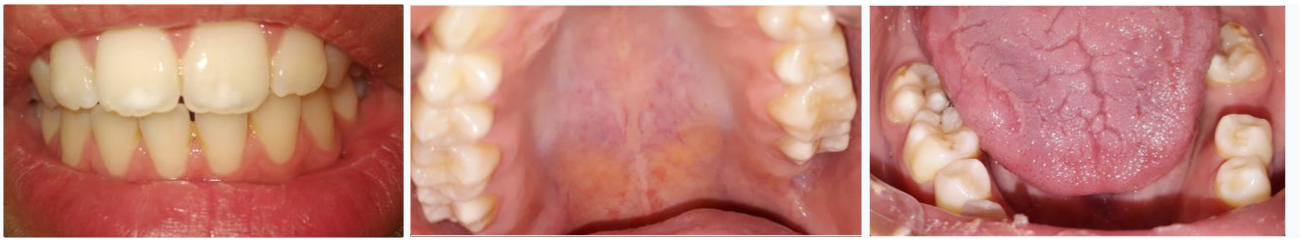
This work aims to describe and illustrate the aesthetic management of white opacities caused by MIH using the resin infiltration technique.

CASE PRESENTATION

A 22-year-old dental medicine student was seen at the Conservative Dentistry/Endodontics consultation at Mustapha University Hospital in Algiers, with the

main complaint of restoring her smile before her wedding. The medical history did not specify any systemic diseases.

The intra-oral examination revealed white spots on the upper central incisors as well as on tooth 12 (fig1a).



(a) (b) (c)

Fig. 1: (a) MIH on maxillary central incisors. (b) MIH on maxillary molars. (c) MIH on mandibular molars

The spots were easily noticeable: chalky white spots on both maxillary central incisors[11,21] and a less pronounced spot affecting tooth #12.

The presence of hypomineralization on the first molars confirmed the diagnosis of MIH (fig 1b and 1c).

Based on the criteria of the Mathu-Muju and Wright classification, these lesions, presenting as well-defined chalky white spots without substance loss or sensitivity reported by the patient, were classified as MIH Class I (mild form). This characterization makes it an indication of choice for treatment by resin infiltration.

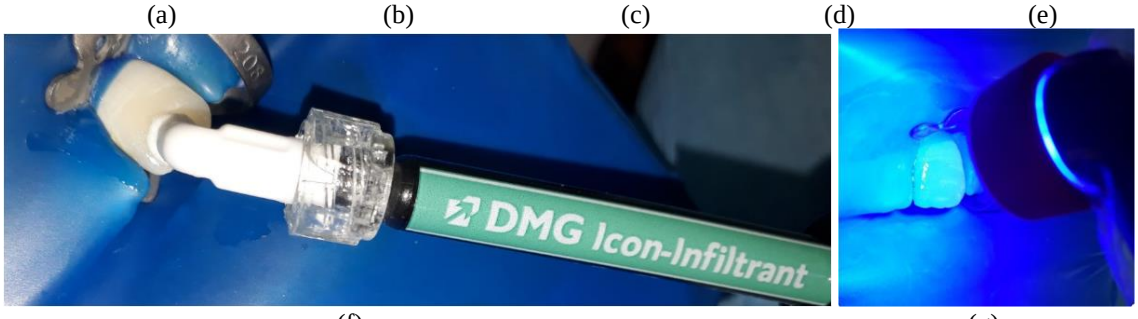
The erosion infiltration technique was therefore proposed and discussed with the patient's consent [9]. The patient was informed of the unpredictability of the infiltration technique and that the possible outcomes ranged from complete disappearance of the lesion, partial improvement, or absence of improvement [10].

Under her agreement, it was decided to perform the resin infiltration technique on teeth 11 and 21. The order of treatment was determined by visual clinical assessment: tooth 21 had a more marked and extensive chalky white opacity than tooth 11, justifying its treatment first.

Treatment procedure

The rubber dam was placed. The resin infiltration technique was performed according to the manufacturer's instructions on the upper central incisors [11]. The superficial enamel layer was eroded by applying hydrochloric acid (Icon-Etch, DMG, Hamburg, Germany) for two minutes (Figure 2b).

(a) (b) (c) (d) (e)



(f) (g)

(h) (i)

Fig. 2: (a) Placement of the rubber dam. (b) Application of hydrochloric acid for 2 minutes. (c) Rinsing for 30 seconds. (d) Application of ethanol. (e) Lesion after drying. (f) Application of the infiltrant for 3 minutes. (g) Photopolymerization. (h) Tooth 21 after infiltration. (i) Result, difference between untreated 11 and treated 21.

This procedure serves to remove superficial stains as well as the mineralized outer layer of the enamel to expose the body of the lesion [12]. Then, the teeth were rinsed for 30 seconds using a water jet and the enamel surfaces were dried.

The surfaces were dried with air and ethanol (Icon-Dry, DMG), which was applied for 30 seconds to maximize the removal of water inside the lesions [13]. The whitish appearance of the enamel lesions was more pronounced.

The resin infiltrant (Icon®) was then applied to the surface of the lesion and left to penetrate for three minutes [14]. Photopolymerization was performed for 40 seconds. The infiltrant was applied again and left for one minute, then photopolymerized for 40 s. Finally, the rubber dam was removed and the surfaces were polished.

RESULTS

An immediate aesthetic improvement, with almost total masking of the spots, was observed after treatment [15] (Figure 2i).

Follow-up checks showed stability of the results over time :

- After 12 months: maintained masking of opacities without recurrence (Figure 3a)
- After 35 months: aesthetic result still satisfactory (Figure 3b)

(a) (b)

Fig. 3: (a) Check-up after 12 months. (b) Check-up after 35 months

DISCUSSION

Enamel opacities associated with MIH can be problematic for patients and present an aesthetic concern. Several techniques have been proposed to improve the appearance of these spots [5]. The therapeutic arsenal for managing MIH defects is sequential and hierarchical and depends mainly on the severity of the lesions. It begins with minimally invasive approaches such as microabrasion [28] and/or external dental bleaching [29].

Our case, classified as MIH Class I (mild), was an indication of choice for resin infiltration. This technique proved to be particularly effective for this level of severity, as evidenced by the immediate results and long-term stability observed. For more severe forms (Class II and III), these preliminary techniques, by eliminating or thinning the superficial enamel layer, can further expose the underlying lesion body. Consequently, resin infiltration is strongly indicated as a final step after these procedures to seal and permanently mask the exposed porosities, thus optimizing the long-term aesthetic result [30]. In cases of substance loss (Class III), more invasive restorative approaches (composites, crowns) remain necessary.

The described case showed significant aesthetic improvement after the application of low-viscosity resin, confirming its role as a first-choice alternative for

masking white opacities in mild MIH [15]. Resin infiltration of the enamel is described as a micro-invasive treatment that strengthens and stabilizes the enamel [16]. This minimally invasive technique can be used to treat superficial lesions up to the first third of the dentin [17].

The principle of resin infiltration is to impregnate the porous enamel with resin by capillary action, thereby stopping the progression of the lesion by obstructing the microporosities that provide diffusion pathways for acids [21]. A positive side effect is that the enamel lesions lose their whitish appearance when these microporosities are filled with resin [22], which was perfectly illustrated in our case.

We can conclude that the resin infiltration technique is a treatment of choice for aesthetically managing white spot lesions of the enamel in mild MIH (Class I). In addition to masking opacities, resin infiltration increases the surface hardness of the enamel, improving its mechanical properties [27].

CONCLUSION

Resin infiltration thus establishes itself as a modern, minimally invasive, and highly predictable therapeutic solution for the management of mild (Class I) aesthetic defects related to molar-incisor hypomineralization. Its effectiveness, demonstrated through this clinical case and supported by growing literature, makes it a first-choice option for this type of lesion, allowing for the restoration of smile harmony and the preservation of dental structure. For more severe defects, it finds its place as an essential complementary step in a sequential treatment plan, optimizing and perpetuating the result of prior techniques such as microabrasion.

REFERENCES

1. Weerheijm KL, Jälevik B, Alaluusua S. Molar-incisor hypomineralisation. Caries Res. 2001 ;35(5):390-1.
2. Alaluusua S. Aetiology of Molar-Incisor Hypomineralisation: A systematic review. Eur Arch Paediatr Dent. 2010 ;11(2):53-8.
3. Jälevik B, Norén JG. Enamel hypomineralization of permanent first molars: a morphological study and survey of possible aetiological factors. Int J Paediatr Dent. 2000 ;10(4):278-89.
4. Lygidakis NA, Wong F, Jälevik B, Vierrou AM, Alaluusua S, Espelid I. Best Clinical Practice Guidance for clinicians dealing with children presenting with Molar-Incisor-Hypomineralisation (MIH). Eur Arch Paediatr Dent. 2010 ;11(2):75-81.
5. Murri D, Marquez J, Contreras CI. Treatment of white spot lesions: A systematic review. J Esthet Restor Dent. 2021 ;33(1):41-48.
6. Kumar VL, Itthagarun A, King NM. The effect of casein phosphopeptide-amorphous calcium phosphate on enamel white spot lesions in vitro. J Clin Pediatr Dent. 2007 ;31(4):241-5.
7. Paris S, Meyer-Lueckel H. Infiltrants inhibit progression of natural caries lesions in vitro. J Dent Res. 2010 ;89(11):1276-80.
8. Mathu-Muju K, Wright JT. Diagnosis and treatment of molar incisor hypomineralization. Compend Contin Educ Dent. 2006 ;27(11):604-10.
9. Kim S, Kim EY, Jeong TS, Kim JW. The evaluation of resin infiltration for masking labial enamel white spot lesions. Int J Paediatr Dent. 2011 ;21(4):241-8.
10. Knösel M, Eckstein A, Helms HJ. Durability of esthetic improvement following Icon resin infiltration of multibracket-induced white spot lesions compared with no therapy over 6 months: a single-center, split-mouth, randomized clinical trial. Am J Orthod Dentofacial Orthop. 2013 ;144(1):86-96.
11. DMG. Icon Etch Instructions for Use. Hamburg, Germany : DMG ; 2010.
12. Meyer-Lueckel H, Paris S. Improved resin infiltration of natural caries lesions. J Dent Res. 2008 ;87(12):1112-6.
13. Paris S, Meyer-Lueckel H. Inhibition of caries progression by resin infiltration in situ. Caries Res. 2010 ;44(1):47-54.
14. Torres CRG, Borges AB, Torres LMS, Gomes IS, de Oliveira RS. Effect of caries infiltration technique and fluoride therapy on the colour masking of white spot lesions. J Dent. 2011 ;39(3):202-7.
15. Paris S, Schwendicke F, Keltsch J, Dörfer C, Meyer-Lueckel H. Masking of white spot lesions by resin infiltration in vitro. J Dent. 2013 ;41 Suppl 5:e28-34.
16. Meyer-Lueckel H, Bitter K, Paris S. Randomized controlled clinical trial on proximal caries infiltration : three-year follow-up. Caries Res. 2012 ;46(6):544-8.
17. Meyer-Lueckel H, Paris S. Progression of artificial enamel caries lesions after infiltration with experimental light curing resins. Caries Res. 2008 ;42(2):117-24.
18. Paris S, Hopfenmuller W, Meyer-Lueckel H. Resin infiltration of caries lesions: an efficacy randomized trial. J Dent Res. 2010 ;89(8):823-6.
19. Meyer-Lueckel H, Paris S, Kielbassa AM. Surface layer erosion of natural caries lesions with phosphoric and hydrochloric acid gels in preparation for resin infiltration. Caries Res. 2007 ;41(3):223-30.
20. Paris S, Meyer-Lueckel H. Masking of labial enamel white spot lesions by resin infiltration--a clinical report. Quintessence Int. 2009 ;40(9):713-8.
21. Meyer-Lueckel H, Paris S. Infiltration of natural caries lesions with experimental resins differing in penetration coefficients and ethanol addition. Caries Res. 2010 ;44(4):408-14.
22. Borges AB, Caneppele TMF, Luz M, Pucci CR, Torres C. Color stability of resin used for caries infiltration after exposure to different staining solutions. Oper Dent. 2014 ;39(4):433-40.

23. Taher NM, Alkhamis HA, Dowaidi SM. The influence of resin infiltration system on enamel microhardness and surface roughness: An in vitro study. Saudi Dent J. 2012 ;24(2):79-84.
24. Crombie F, Manton D, Palamara J, Reynolds E. Resin infiltration of developmentally hypomineralised enamel. Int J Paediatr Dent. 2014 ;24(1):51-5.
25. Belkhir MS, Douki N. L'infiltration résineuse : une alternative thérapeutique mini-invasive pour les taches blanches actives de l'émail. Tunis Med. 2017 ;95(1):1-6.
26. Celik EU, Yildiz G, Yazkan B. Clinical evaluation of resin infiltration treatment masking effect on hypomineralized enamel surfaces. Med Princ Pract. 2021 ;30(1):71-77.
27. Schmidlin PR, Sener B, Attin T, Wiegand A. Protection of sound enamel and artificial lesion development using sealants and infiltrants. Am J Dent. 2009 ;22(3):173-6.
28. Sundfeld D, Sundfeld-Neto D, Machado LS, Franco LM, Fagundes TC, Briso AL. Microabrasion in tooth enamel discoloration defects: three cases with long-term follow-ups. J Appl Oral Sci. 2014 ;22(4):347-54.
29. Attin T, Müller B, Patyk A, Lennon AM. Influence of different bleaching systems on fracture toughness and hardness of enamel. Oper Dent. 2004 ;29(2):188-95.
30. Torres CRG, Zanatta RF, Silva TJ, Borges AB. Effect of prior bleaching on the bond strength of resin-based restoration to enamel: A systematic review and meta-analysis. J Esthet Restor Dent. 2020 ;32(4):383-394.
31. Fragelli CMB, Souza JF, Jeremias F, Cordeiro RCL, Santos-Pinto L. Molar incisor hypomineralization (MIH): conservative treatment management to restore affected teeth. Braz Oral Res. 2015 ;29(1) :1-7.