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Amelogenesis imperfecta: A Clinical Journey Toward Definitive Rehabilitation – A Case Report Cardoso

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Posted Date: August 7th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10328882/v1

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Additional Declarations: No competing interests reported.

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Abstract

Amelogenesis Imperfecta (AI) is a genetic condition that affects enamel formation and mineralization, leading to esthetic alterations, dentin hypersensitivity, and significant psychosocial impact. This report describes the case of A.M.S., a 35-year-old male patient who sought dental care with the chief complaint of severe sensitivity and esthetic impairment associated with AI.

Given the complexity of the case, its specific clinical characteristics, and the patient's expectations, a multidisciplinary treatment plan was established. The protocol included an initial orthodontic approach, provisional rehabilitation using injected resin, followed by definitive oral rehabilitation aimed at restoring function, esthetics, and occlusal stability.

The interventions were successful, resulting in significant improvement in dental esthetics and reduction of hypersensitivity, as well as positively contributing to the patient's self-esteem and overall quality of life. It can be concluded that a structured multidisciplinary approach is essential for the effective management of AI, enabling predictable functional and esthetic outcomes and a positive impact on the patient's overall oral health.

Key Words: Amelogenesis Imperfecta, Oral Rehabilitation, Case Report, Multidisciplinary Approach, Dental Esthetics

Introduction

Amelogenesis Imperfecta (AI) represents a complex group of hereditary conditions that disrupt the normal development of dental enamel. This disturbance in the amelogenesis process can manifest in both primary and permanent dentitions, or be restricted solely to the permanent teeth [1-5]. While AI may occur as an isolated oral trait, it is frequently documented as part of broader syndromic presentations [5-8].

From a clinical perspective, patients often present with enamel dysplasia, significant discoloration, and post-eruptive structural failure. These defects frequently lead to intense dentin hypersensitivity and a progressive reduction in occlusal vertical dimension (OVD) [1-2, 8]. Furthermore, the susceptibility to dental caries, gingival inflammation (including hyperplasia), and malocclusions—particularly anterior open bite—is markedly higher in this population [1-2, 8]. Beyond the physical symptoms, the fragility of the enamel compromises masticatory function, which may negatively impact the patient's nutritional status and systemic health [9, 10]. The burden of AI extends to psychosocial and economic spheres; patients and their families often face challenges related to aesthetic-driven bullying, substantial treatment expenses, and the logistical strain of frequent clinical interventions [11-14]. These issues are often exacerbated by difficulties in accessing specialized multidisciplinary centers and unclear referral protocols [9-11, 15].

Effective management of AI demands rigorous clinical planning, initiated by an accurate diagnosis and followed by a customized restorative strategy [10, 16]. Intervening early is paramount to safeguard tooth structure and maintain stable occlusal relationships. During the primary dentition phase, preventive measures often include the use of stainless-steel crowns on posterior teeth. As the patient transitions into mixed dentition, long-term provisional

treatments are essential to manage sensitivity, prevent further loss of tooth structure, and preserve both OVD and aesthetics.

In the permanent dentition stage, the therapeutic focus shifts toward the comprehensive restoration of function, aesthetics, and OVD, alongside the elimination of sensitivity. This stage necessitates a multidisciplinary approach involving orthodontics, periodontics, and prosthodontics [2]. For adolescents and young adults, the placement of definitive restorations, such as veneers or full-coverage crowns, is considered the gold-standard long-term strategy. The final rehabilitative phase involves precise tooth preparation and the selection of advanced materials—such as lithium disilicate or hybrid ceramics—tailored to the specific mechanical and aesthetic requirements of the case [11, 17].

The present study reports a clinical case that addresses this treatment trajectory, including prior orthodontic therapy, a provisional phase with injected resin, and ultimately the final rehabilitation. It highlights the challenges encountered and the importance of a structured clinical protocol to achieve an aesthetic, functional, ideal, and long-lasting restorative outcome.

Case presentation

Patient A.M.S., a 35-year-old male, was extremely distressed about his dental condition due to Amelogenesis Imperfecta (AI)—a genetic condition that negatively affects dental aesthetics and results in poor enamel formation and mineralization, leading to significant dental sensitivity. Given the complexity of the case, its particularities, and the patient's expectations, a multidisciplinary treatment plan was proposed.

Initial Assessment

Initially, through orthodontic evaluation, the patient was diagnosed with anterior open bite and posterior crossbite. To improve the maxillomandibular relationship, orthognathic surgery was indicated, and a request for complete orthodontic documentation was made (11/11/2021). The patient underwent gingival surgery (gingivoplasty) on elements 16 to 26, aiming to increase crown height and improve gingival contour. However, the crowns still appeared short for the installation of orthodontic brackets or aligners.

Provisional Restoration

To enable orthodontic treatment, the patient was referred to the ABO (GO) for the fabrication of provisional veneers. After analyzing the case and the possibilities of intervention, it was decided to create the provisional veneers using the injectable resin technique (10/03/2022). A digital planning was conducted to create the model and subsequently manufacture the guide for installing the injectable veneers.

Orthodontic Treatment

After the installation of the veneers, facilitating orthodontic treatment, a new planning session was conducted to align the teeth and improve the maxillomandibular relationship (25/05/2022). Following orthodontic analysis, it was decided to install brackets, as they provided greater control and torque for the lower roots (the vestibular bone table in the lower incisor region was thin). The plan included differentiated bonding to extrude the anterior teeth and intrude the posterior teeth, and the patient began fixed orthodontic treatment in June 2022.

Occlusal Adjustment and Treatment Progress

On 25/06/2022, an occlusal adjustment was performed to align and level the upper and lower arches, correcting the Curve of Spee. Subsequently, intermaxillary elastics and wire bends were used to close the anterior open bite, applying torque to the wires for crown/root adjustment (23/10/2022). By December 2023, the patient was cleared to proceed to dental aesthetics, with impressions taken for the fabrication of retainers, and in January 2024, the orthodontic treatment concluded with the removal of the upper and lower appliances.

Final Rehabilitation

Commencing with aesthetic planning, considering the complexity of the case, imaging exams, and the patient's expectations, the installation of total crowns in milled resin for the posterior teeth and total crowns in lithium disilicate for the anterior teeth was planned (21/06/2024). A complete photographic protocol (extraoral and intraoral) and neuromuscular desprogramming with a Lucia jig were performed to find the Centric Relation (CR) and Vertical Dimension of Occlusion (VDO) of the patient.

The provisional veneers were removed only in the areas where dental preparations would begin, minimizing the possibility of sensitivity in other regions. Preparations for total crowns began with the lower posterior teeth, followed by the upper posterior teeth, with impressions or scanning for the fabrication of the restorations (08/10/2024). To ensure greater stability of the provisionals and comfort for the patient in these regions, the decision was made to fabricate the provisionals in acrylic resin.

After the installation of total crowns in milled resin on the posterior teeth (13/11/2024), the provisional veneers were removed, and preparations for the anterior teeth began, starting with the lower teeth and then the upper teeth. In both regions, after analyzing the condition of the dental

elements, it was decided to increase the length of the teeth using direct composite resin, aiming to increase the lever arm and consequently enhance the longevity of the rehabilitative treatment. Impressions and scans were taken, and the pieces were sent to the laboratory for the fabrication of ceramic restorations, which were subsequently installed/cemented (22/05/2025). A new scan was then performed for the fabrication of an occlusal splint, followed by adjustments and delivery (20/08/2025).

Discussion

The management of Amelogenesis Imperfecta (AI) is consistently complex and necessitates a multidisciplinary strategy. Clinical care should involve continuous monitoring to forestall progressive dental wear and structural damage, focusing on long-term interventions customized to the patient's specific requirements [6]. Depending on the condition's severity and the individual's expectations, several restorative paths may be considered, including direct techniques, indirect options such as veneers or full-coverage crowns, and, in certain instances, tooth extraction followed by fixed, implant-supported, or removable prosthodontics [17, 18]. Selecting the correct restorative materials for the definitive rehabilitation is vital and must be approached with care, considering the unique aspects of the clinical case [10].

AI demands a systematic clinical protocol that targets both functional and psychosocial requirements, as these factors deeply influence the patient's general quality of life. The compromised aesthetics in individuals with AI often leads to social avoidance and the emergence of psychological challenges. To mitigate these effects, restorations providing the highest aesthetic quality should be prioritized. Consequently, we selected all-ceramic crowns, which offered an ideal balance of aesthetic excellence and the preservation of the remaining

tooth structure. A collaborative approach involving dental practitioners, orthodontists, and psychologists can facilitate the creation of a more integrated and successful treatment strategy [13, 19].

Amelogenesis Imperfecta is frequently linked to particular dental and skeletal discrepancies, such as a constricted maxillary arch, skeletal open bite, a reverse curve of Spee, and vertical growth patterns [20]. A narrowed maxillary arch, characterized by an irregular occlusal plane and a vertical growth tendency, was identified in our patient, alongside an open bite.

Significant loss of dental tissue often results in insufficient clinical crown height for restoration placement, making surgical crown lengthening a necessity [21]. When organizing crown lengthening procedures, it is essential to determine if the biologic width will be compromised. If the space is invaded, it may trigger gingival recession in patients with thin tissue biotypes or hyperplasia in those with thick biotypes [22, 23]. This case report highlights the importance of crown lengthening in achieving a balanced and aesthetic restoration for patients with AI.

The probability of endodontic issues, including loss of pulp vitality, pulpitis, and apical periodontitis following crown placement in AI cases, has been documented between 3% and 7.6% [24, 27]. Although some literature suggests the necessity of endodontic therapy before prosthetic work due to the disease's intensity, we chose a more conservative path; thus, elective endodontic treatment for prosthetic reasons was not required for this patient [25-27].

This conservative strategy is supported by the application of lithium disilicate ceramic restorations, which offer a superior combination of aesthetics, marginal fit, durability, and adhesion to the natural

tooth. This material necessitates less tooth preparation compared to zirconia-based or metal-ceramic options, thereby protecting more of the natural dental substrate [28].

A reduction in Occlusal Vertical Dimension (OVD) is another frequent finding in those affected by Amelogenesis Imperfecta [11]. This loss creates an irregular occlusal plane, which leads to occlusal interferences and worsens the overall dental state. Our treatment objective involved recovering the lost OVD while establishing a level occlusal plane for balanced function and aesthetics. One technique for increasing OVD involves using temporary bridges at the new height for at least 4-6 weeks. In this specific case, provisional veneers were necessary before starting orthodontic therapy, and the injectable resin technique was selected for its high stability. Following the placement of these veneers, orthodontic care was conducted systematically, allowing for the subsequent refinement of dental alignment and the maxillomandibular relationship. The orthodontic phase with resin provisionals lasted 9 months, ensuring both function and aesthetics were maintained. A harmonious smile has a profound psychosocial impact on an individual's personality.

Declarations

Ethics approval and consent to participate

Not Applicable

Consent for publication: Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of data and materials: The datasets generated and/or analysed during the current study are not publicly available due to ethical restrictions regarding patient privacy and confidentiality, but are available from the corresponding author on reasonable request.

Funding

The authors declare that they have no financial competing interests.

Acknowledgements

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List of Abbreviations

Fig. 1 - Extraoral photograph of full face
Fig. 2 - Extraoral photograph of lateral face
Fig. 3 -Initial condition of the patient, highlighting Amelogenesis Imperfecta, as well as Anterior Open Bite and Posterior Crossbite.
Fig. 4 - Frontal view of Provisional Veneers with patient in occlusion
Fig. 5 - Frontal and lateral views of the Provisional Veneers
Fig. 6 - Patient with Fixed Orthodontic Appliance installed
Fig. 7 - View with occlusal mirror of the upper posterior preparations
Fig. 8 - Installed Milled Resin on Upper Posteriors
Fig. 9 - Analysis of the substrate and selection of the color of the ceramic pieces
Fig. 10 -Ceramic Pieces in Lithium Disilicate
Fig. 11 - Installed Upper Anterior Pieces
Fig. 12 - Patient's occlusion after rehabilitation
Fig. 13 - Final Frontal Photograph

Fig. 2 - Extraoral photograph of lateral face

Fig. 3 - Initial condition of the patient, highlighting Amelogenesis Imperfecta, as well as Anterior Open Bite and Posterior Crossbite.

Fig. 4 - Frontal view of Provisional Veneers with patient in occlusion

Fig. 5 - Frontal and lateral views of the Provisional Veneers

Fig. 6 - Patient with Fixed Orthodontic Appliance installed

Fig. 7 - View with occlusal mirror of the upper posterior preparations

Fig. 8 - Installed Milled Resin on Upper Posteriors

Fig. 9 - Analysis of the substrate and selection of the color of the ceramic pieces

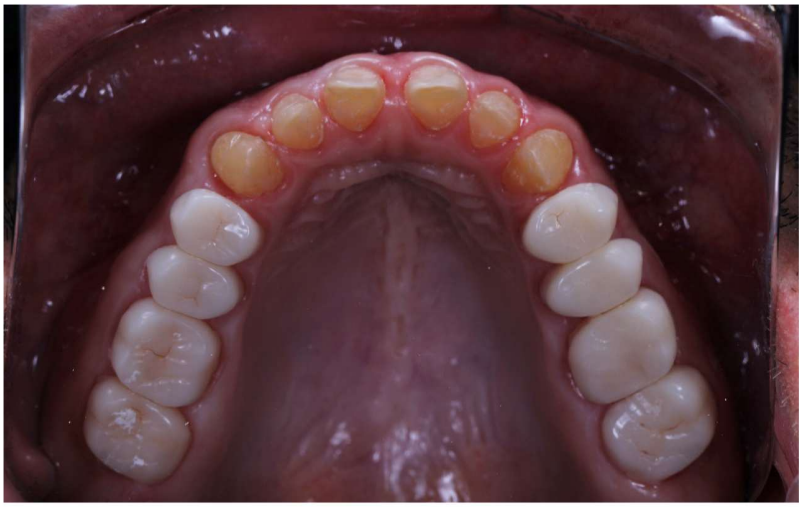

Fig. 11 - Installed Upper Anterior Pieces

Fig. 12 -Patient's occlusion after rehabilitation

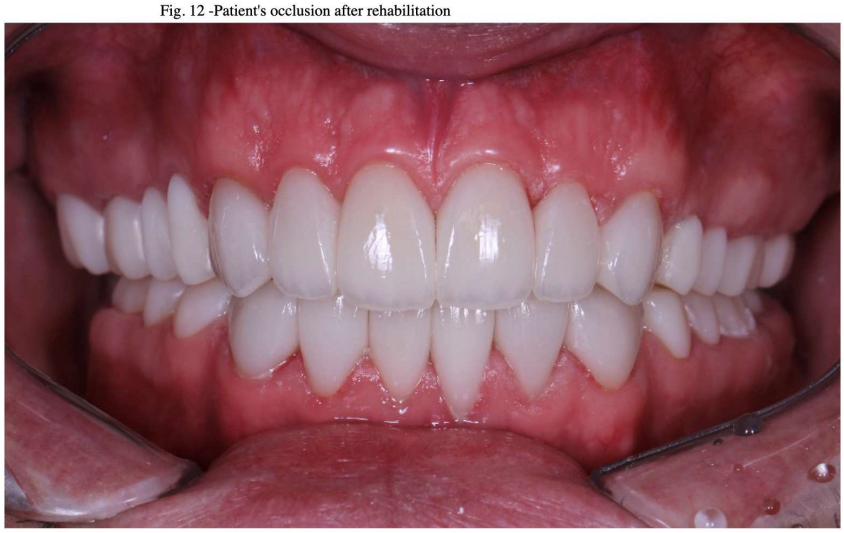
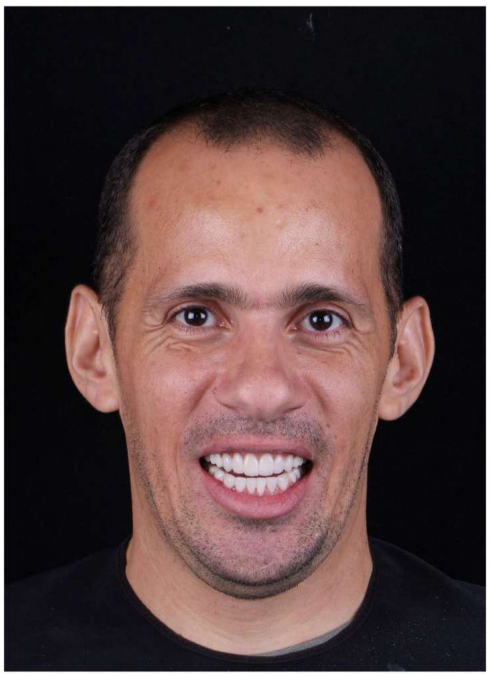
Fig. 13 - Final Frontal Photograph