

Anterior Esthetic Rehabilitation with Feldspathic Ceramic Laminate Veneers Guided by a Digital Workflow: Case Report

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Abstract: Minimally invasive ceramic laminate veneers have become a predictable solution for smile esthetics, especially when paired with digital planning. This study reports a clinical case of anterior esthetic rehabilitation using feldspathic ceramic laminate veneers, highlighting the application of a digital workflow. A 30-year-old male patient sought treatment with the chief complaint of dissatisfaction with the color, shape, and contours of the maxillary anterior teeth, as well as the presence of minor diastemas and incisal wear. Planning was carried out through a digital workflow that included photography, diagnostic waxing, and 3D design, enabling an esthetic mock-up for patient approval. Treatment consisted of guided, minimally invasive tooth preparations and adhesive cementation of feldspathic ceramic laminate veneers. The final result demonstrated excellent esthetic and functional integration, with a marked improvement in smile harmony and high patient satisfaction. This case underscores that the digital workflow was essential to ensure treatment predictability and precision.

Keywords: Porcelain laminate veneers; Feldspathic ceramic; Dental esthetics; Digital workflow; Smile rehabilitation.

Citation: Sobrinho LHDS. Anterior Esthetic Rehabilitation with Feldspathic Ceramic Laminate Veneers Guided by a Digital Workflow: Case Report. Brazilian Journal of Dentistry and Oral Radiology. 2023 Jan-Dec;2:bjd30.

doi: <https://doi.org/10.52600/2965-8837.bjdor.2023.2.bjd30>

Received: 28 July 2023

Accepted: 30 August 2023

Published: 5 September 2023



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1. Introduction

The management of smile esthetics in contemporary dentistry increasingly relies on integrated digital workflows [1]. This approach links esthetic objectives to functional requirements [2]. The digital restorative process encompasses technologies such as 3D printing for the fabrication of provisional restorations, which has shown high accuracy in marginal and internal fit [3]. Computer-aided technologies (CAD/CAM) have become central to oral rehabilitation [4], enabling a fully digital workflow for the creation of customized veneers [5]. Materials such as resin composite and ceramic veneers are used to address esthetic challenges [6]. Planning is supported by digital smile design software that applies comprehensive esthetic parameters [7].

Successful esthetic rehabilitation often requires an interdisciplinary approach, combining different materials and techniques to address complex challenges [6]. Material selection, whether resin composite or glass-ceramics, is critical [6]. The digital flow facilitates this integration, allowing esthetic planning [7] to guide the precise fabrication of restorations [3], whether by subtractive milling or additive 3D printing [4, 5]. The aim of this work is to report a clinical case of esthetic rehabilitation with ceramic laminate veneers, emphasizing the application of an integrated digital workflow to achieve the final outcome.

2. Case Report

A 30-year-old male patient presented with an esthetic complaint related to his smile (Figures 1A and 2A). He reported dissatisfaction with the yellowish coloration, irregular shape and contours, as well as slight diastemas in the maxillary anterior teeth. The patient did not wish to undergo orthodontic treatment. Medical history revealed good general health, no comorbidities, non-smoker status, and mild episodes of nocturnal bruxism. Clinical examinations showed adequate periodontal health, moderate incisal wear, and good oral hygiene. The proposed, and patient-accepted, treatment plan was rehabilitation of the maxillary anterior teeth with feldspathic ceramic laminate veneers, aiming to optimize esthetics with minimal tooth reduction.

Treatment began with preliminary impressions of the maxillary and mandibular arches using addition silicone, followed by an occlusal record and mounting of the casts on a semi-adjustable articulator. An analog diagnostic wax-up was performed, serving as the basis for a 3D design and the fabrication of silicone guides. The wax-up was transferred intraorally through a functional and esthetic mock-up, allowing preview and approval of the new smile.

After approval, minimally invasive tooth preparation was carried out, focusing on preserving as much enamel as possible. The reduction was guided by vestibular preparation guides (Figures 1B and 1D), ensuring controlled and uniform reduction (Figure 1C). Following preparations, a definitive impression was made with a high-precision material, and esthetic provisionals were placed. The laminate veneers were fabricated in feldspathic ceramic. The clinical try-in confirmed marginal adaptation, shade, and form. Cementation was performed under rubber dam isolation, following a strict adhesive protocol that included enamel acid etching, silanization of the ceramic restorations, and use of a light-cured resin cement.

The outcome showed a significant improvement in smile harmony, with natural color (Figure 2B). Esthetic and functional integration was achieved, with maintenance of occlusion and high patient satisfaction.

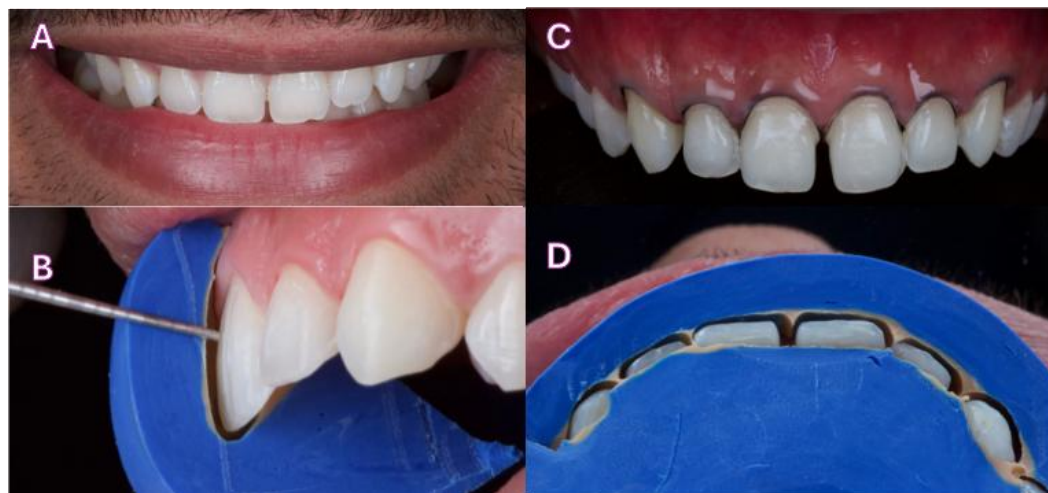


Figure 1: Planning and preparation steps. A. Initial frontal view. B. Verification of facial (labial) reduction with a silicone guide (matrix). C. Aspect of the minimally invasive preparations. D. Occlusal view of the preparation guide in position.

3. Discussion

Success in contemporary esthetic rehabilitation is intrinsically linked to the implementation of an integrated digital workflow [1]. The present clinical case supports this approach, demonstrating how digital tools connect esthetic planning to occlusal function [2]. Treatment predictability was enhanced through digital smile planning, which enables the application of comprehensive esthetic parameters [7].

The literature has extensively reviewed the advantages of computer-aided technologies in oral rehabilitation [4]. Within the digital restorative flow, accuracy is a critical factor. Studies on additive manufacturing (3D printing) of provisional crowns, for example, have demonstrated clinically acceptable marginal and internal adaptation [3]. This precision, inherent to digital processes, is carried over to the fabrication of definitive restorations such as ceramic laminate veneers.



Figure 2: Clinical comparison. A. Baseline smile showing diastemas, incisal wear, and irregular contours. B. Final result after cementation of the ceramic laminate veneers.

Furthermore, a fully digital workflow allows for the fabrication of customized restorations [5]. Although the present case employed ceramics, the literature shows that the same digital flow can be successfully applied to different materials, such as composite resin veneers [5]. Managing complex esthetic challenges often requires an interdisciplinary approach that combines different restorative materials, resins and ceramics, to optimize outcomes [6]. Digital planning [1, 2] serves as the foundation that unifies these various treatment modalities.

4. Conclusion

This case report demonstrated the effectiveness of an integrated digital workflow for esthetic management of a smile using ceramic laminate veneers. The use of digital tools, from planning through execution, was essential to ensure a seamless transition from esthetic design to a functional outcome. The digital approach enabled

the fabrication of precise restorations, resulting in a predictable treatment that met the patient's esthetic expectations.

Funding: None.

Research Ethics Committee Approval: We affirm that the participant consented to the research by endorsing a clear consent document, and the investigation adhered to the ethical standards outlined in the Helsinki Declaration.

Acknowledgments: None.

Conflicts of Interest: None.

Supplementary Materials: None.

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