

Case Report

Conservative Retreatment of Ten Failing Ceramic Veneers Using Er:YAG Laser-Assisted Debonding, Diagnostic Mock-up, Gingival Recontouring, and Adhesive Cementation: A Case Report

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Background: Retreatment of bonded ceramic veneers is challenging because removal may sacrifice additional tooth structure, while the causes of the original failure must also be corrected. This report describes a conservative, reverse-planning approach for replacing ten maxillary ceramic veneers with esthetic, marginal, periodontal, and retention-related deficiencies.

Case presentation: A 38-year-old woman sought retreatment of ten maxillary ceramic veneers placed in 2020. Her concerns included color, opacity, form, proportion, tooth position, and recurrent debonding. Clinical examination identified marginal misfit and infiltration in selected teeth, together with gingival inflammation.

Intervention and outcome: The existing veneers were removed with an Er:YAG laser-assisted approach. Following removal, diagnostic impressions and photographs were obtained, and an additive diagnostic wax-up and bis-acryl mock-up were used to guide selective reparation. Gingival recontouring was performed with a 15C scalpel blade while respecting periodontal limits. Final impressions were made using a two-step addition-silicone technique. The new veneers were tried in with a translucent try-in paste and adhesively cemented with a light-cured resin cement. Short-term reassessment documented improved smile harmony, marginal integration, and function. No standardized patient-reported outcome measure was collected.

Conclusion: Replacement of failing ceramic veneers should be treated as a new interdisciplinary rehabilitation rather than a simple exchange of restorations. In this case, laser-assisted removal, diagnostic wax-up, mock-up-guided selective preparation, soft-tissue correction, and controlled

adhesive cementation supported a conservative retreatment. The limited follow-up and absence of recorded laser parameters restrict generalization.

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1. Introduction

Ceramic veneers are a conservative option for modifying the color, form, texture, proportion, and limited alignment of anterior teeth. Their clinical performance is generally favorable, but survival depends on diagnosis, preparation design, the amount of enamel available for bonding, ceramic selection, marginal adaptation, adhesive procedures, occlusal control, and maintenance [1][2][3][4]. Fracture or chipping, debonding, marginal discoloration, secondary caries, and biologic complications are among the events reported in long-term studies [1][2].

Retreatment is more complex than primary veneer therapy. The clinician must remove bonded ceramic while preserving an already modified substrate, identify the mechanisms associated with the initial failure, and develop a new restorative design that does not simply reproduce the original deficiencies. Erbium lasers have been investigated as an adjunct for ceramic veneer debonding because energy transmitted through the restoration may interact with resin cement and reduce bond strength. Laboratory studies and a recent systematic review support the potential of erbium lasers for conservative debonding when appropriate settings and cooling are used, although outcomes are influenced by ceramic type, thickness, translucency, cement, laser parameters, and application mode [5][6][7].

Reverse planning with an additive wax-up and intraoral mock-up can provide a physical preview of the intended result and guide the amount and location of tooth reduction [4][8][9]. In retreatment, these steps are especially relevant because the existing preparations may be nonuniform and the restorative volume must be redesigned around the remaining tissue.

This case report, prepared in accordance with the CARE reporting framework [10], describes the conservative replacement of ten failing maxillary ceramic veneers using Er:YAG laser-assisted debonding, diagnostic wax-up, mock-up-guided selective reparation, gingival recontouring, and adhesive cementation.

2. Case Presentation

2.1. Patient information and main concerns

A 38-year-old woman presented to a postgraduate restorative dentistry clinic seeking replacement of ten maxillary ceramic veneers that had been placed in 2020. The patient reported dissatisfaction with the restorations' color, opacity, form, proportions, and apparent tooth positions. She also reported recurrent debonding episodes.

The source record states that the patient had experienced substantial discomfort during the previous treatment. Relevant medical, medication, allergy, family, and psychosocial histories were not documented in the available thesis and therefore cannot be reported. The patient's identity is withheld.

2.2. Clinical findings and diagnostic assessment

Extraoral and intraoral photographs and addition-silicone impressions were obtained. Clinical examination identified marginal misfit and marginal infiltration in selected restored teeth. The gingival tissues showed signs of inflammation. The existing veneers were described as bulky, with unfavorable form and excessive restorative volume, particularly in the canine and premolar regions.

The working diagnosis was failure of the existing maxillary ceramic veneer rehabilitation, characterized by esthetic dissatisfaction, recurrent loss of retention, marginal deficiencies, and associated gingival inflammation. A full retreatment of the ten restorations was selected because the deficiencies involved multiple teeth and could not be predictably corrected by isolated repair.

The available record did not include radiographs, periodontal probing values, pulp tests, a formal occlusal analysis, or calibrated esthetic measurements. These omissions are recognized as limitations.

2.3. Clinical timeline

Clinical stage	Main procedures
Initial assessment	History of esthetic dissatisfaction and recurrent debonding; clinical and photographic examination; preliminary impressions.
Removal visit	Er:YAG laser-assisted debonding of the ten existing veneers; impression of the exposed tooth preparations; same-day bis-acryl provisionalization.
Planning phase	Laboratory diagnostic wax-up designed to preserve residual tooth structure; silicone index produced from the wax-up.
Mock-up and preparation	Bis-acryl mock-up transferred intraorally; esthetic acceptance without requested design changes; selective reduction through the mock-up in bulky canine and premolar regions; finishing and polishing.
Soft-tissue phase	Gingival recontouring with a 15C scalpel blade, respecting the clinically assessed periodontal limits.
Definitive impression	Two-step heavy- and light-body addition-silicone impression and occlusal registration.
Try-in and cementation	Assessment of fit and color with translucent try-in paste; ceramic and tooth surface treatment; adhesive cementation of ten veneers; proximal cleanup, finishing, polishing, and occlusal adjustment.
Short-term review	Final clinical and photographic reassessment several weeks later; evaluation of esthetic integration and function.

3. Therapeutic Intervention

3.1. Laser-assisted veneer removal and provisionalization

Because the previous restorations were considered bulky and the patient reported significant discomfort during their placement, the treatment team selected an Er:YAG laser-assisted approach for removal. A LiteTouch Er:YAG dental laser (Light Instruments Ltd.) was used to debond the ten veneers. The source record did not report energy per pulse, repetition rate, pulse duration, fluence, tip diameter, working

distance, scanning pattern, irradiation time, or air-water cooling settings. Accordingly, this case cannot be used to recommend a specific laser protocol.

After removal, an impression was obtained for a new diagnostic wax-up. Provisional restorations were fabricated with bis-acryl resin using the initial impression, allowing the patient to leave the clinic with interim coverage while the definitive design was developed.

3.2. Diagnostic wax-up, mock-up, and selective repreparation

The laboratory was instructed to produce a conservative diagnostic wax-up based on the residual tooth structures. A silicone index was fabricated from the wax-up. Bis-acryl resin in a bleach shade was loaded into the index and transferred intraorally to create a diagnostic mock-up.

The mock-up allowed assessment of tooth form, length, proportion, and restorative volume before definitive preparation. The source record states that no modifications to the proposed design were requested. Evaluation of the wax-up and mock-up showed excessive incisal volume in the canine and premolar regions. Selective reduction was therefore performed through the mock-up with a wheel-shaped diamond instrument (KG 4142), followed by finishing and polishing with fine-grit cylindrical diamond instruments (KG 4139F). The intent was to remove only the tissue required to obtain restorative space and a more natural contour.

3.3. Gingival recontouring and definitive impression

At a subsequent visit, gingival recontouring was performed with a 15C scalpel blade to improve the relationship between tooth proportions and the gingival margins. The procedure was described as respecting biologic and periodontal limits; however, bone sounding, periodontal measurements, and healing intervals were not documented in the available record.

The definitive impression was made using a two-step heavy- and light-body addition-silicone technique (Futura AD, Nova DFL) in a Moldex-type tray, with simultaneous recording of the occlusal relationship.

3.4. Try-in, adhesive cementation, and finishing

The completed veneers were evaluated intraorally for seating, marginal adaptation, form, and color. A translucent try-in paste from the Allcem Veneer system (FGM) was used to preview the optical contribution of the luting material. Try-in materials are useful for estimating the final color, although the agreement between trial paste and polymerized cement is material- and thickness-dependent ^[11].

According to the source record, the internal ceramic surfaces had been airborne-particle abraded by the laboratory. They were etched with hydrofluoric acid for 20 seconds, thoroughly rinsed and dried, followed by two silane applications and an adhesive layer. The exact ceramic composition was not documented. Because hydrofluoric-acid concentration and etching time must be selected according to the ceramic and manufacturer instructions, the procedure reported here should not be generalized to other ceramics [\[12\]](#) [\[13\]](#)[\[14\]](#).

The tooth substrates were etched with 35% phosphoric acid for 30 seconds, rinsed, and dried, followed by application of Adper Single Bond 2 (3M). A translucent light-cured resin cement (Allcem Veneer APS, FGM) was placed inside each treated veneer. The restorations were seated, excess cement was removed, including interproximal cleanup with dental floss, and each surface was light-polymerized for 60 seconds as documented in the clinical record.

After all ten veneers were bonded, residual cement and adhesive were removed. Interproximal finishing and polishing were performed with abrasive metal strips, followed by occlusal evaluation and adjustment.

4. Follow-up and Outcomes

The final review was delayed for several weeks because of an unrelated health event affecting the patient. At the short-term reassessment, clinical and photographic evaluation showed a more harmonious smile design, improved tooth proportions, and better integration between the restorations and gingival contours. Function and occlusion were reassessed, and no immediate adverse event was documented.

The available documentation did not include a standardized esthetic score, periodontal indices, patient-reported outcome measure, radiographic comparison, or long-term survival assessment. Therefore, the outcome should be interpreted as a short-term descriptive clinical result rather than evidence of durability.

5. Patient Perspective

A verbatim patient narrative was not collected in the source documentation. The record states that the patient accepted the diagnostic mock-up without requesting design changes. No validated satisfaction questionnaire or formal patient-reported outcome measure was administered.

6. Discussion

This case illustrates that replacement of failing ceramic veneers involves three interconnected objectives: conservative removal of existing restorations, correction of the factors associated with failure, and creation of a new restorative design compatible with the remaining tooth structure and periodontal tissues. The recurrent debonding, marginal deficiencies, gingival inflammation, and broad esthetic dissatisfaction made simple repair an unsuitable strategy.

Preservation of enamel is a central principle in veneer therapy because clinical survival is generally higher when bonding remains predominantly in enamel [3]. In a retreatment, however, the operator begins with a previously prepared substrate. The removal method can therefore materially affect the amount and quality of tissue available for the second rehabilitation. Er:YAG laser-assisted debonding was selected to reduce reliance on rotary cutting. Experimental studies have shown that Er:YAG irradiation can lower the bond strength of porcelain veneers and facilitate removal [5][6], while a systematic review and meta-analysis concluded that erbium lasers have an immediate debonding effect and may preserve underlying tooth structure when suitable settings are used [7].

These findings do not make laser debonding a uniform procedure. Laser transmission and cement interaction vary with ceramic composition, restoration thickness and translucency, resin cement, irradiation parameters, application mode, and cooling. In the present case, the absence of recorded laser settings is a major reproducibility limitation. The report should therefore be interpreted as documentation of a clinical strategy, not as validation of a specific laser protocol.

The diagnostic wax-up and mock-up were used both as communication tools and as preparation guides. Mock-up-driven preparation has been advocated to preserve enamel by relating reduction to the planned external contour rather than to the pre-existing tooth or restoration [4][8][9]. This principle was particularly useful here because the old veneers were described as bulky. Selective reduction through the approved mock-up targeted the canine and premolar areas where the planned contours indicated excess volume.

Gingival inflammation and altered margin relationships were addressed before the definitive impression. Restorative esthetics cannot be separated from periodontal health. The decision to recontour the gingiva should be based on clinical examination, probing, attachment and bone levels, phenotype, and the intended restorative margin. The source record did not contain these measurements, so the biologic rationale cannot be independently assessed from the manuscript.

The adhesive sequence combined hydrofluoric-acid etching, silane, tooth etching, an adhesive system, and light-cured resin cement. For silica-based glass ceramics, micromechanical conditioning and silanization are established components of resin bonding ^{[13][14]}. Nonetheless, the ceramic type must be known because zirconia and other polycrystalline ceramics require different surface treatment. The lack of documentation regarding the replacement ceramic is therefore clinically relevant.

A translucent try-in paste was used before definitive bonding. The final optical outcome of thin veneers is influenced by substrate color, ceramic thickness and translucency, and the luting material. Trial pastes can assist selection, but they do not always perfectly reproduce the color of the polymerized resin cement ^[11]. Light-cured veneer cements are commonly selected for working time and color stability, and clinical studies have reported favorable color behavior over time ^[15].

This report has several limitations. It represents one patient, offers only short-term follow-up, lacks complete periodontal and occlusal measurements, does not report the ceramic composition or laser settings, and contains no validated patient-reported outcome. Its value is therefore educational: it shows how conservative removal, reverse planning, soft-tissue management, and adhesive execution can be integrated when a multiunit veneer rehabilitation requires replacement.

7. Conclusion

The retreatment of failing ceramic veneers should be planned as a new esthetic, periodontal, adhesive, and functional rehabilitation. In this case, Er:YAG laser-assisted removal was combined with an additive diagnostic wax-up, mock-up-guided selective preparation, gingival recontouring, and adhesive cementation of ten new maxillary veneers. The strategy supported conservation of the remaining tooth structure and correction of the original restorative volume and marginal relationships. Because follow-up was short and key technical parameters were not recorded, no inference can be made regarding long-term superiority or a universal laser protocol.

Figures



Figure 1. Baseline frontal smile showing the pre-existing maxillary ceramic veneer rehabilitation.



Figure 2. Baseline retracted intraoral view showing the ten maxillary veneers and marginal relationships.



Figure 3. Er:YAG laser-assisted removal of the pre-existing ceramic veneers.



Figure 4. Laboratory diagnostic wax-up designed to guide the conservative retreatment.



Figure 5. Intraoral bis-acryl mock-up used to assess form, length, proportion, and restorative volume.



Figure 6. Final frontal smile at short-term reassessment after adhesive cementation.



Figure 7. Final retracted intraoral view showing the ten new maxillary ceramic veneers.

Notes

Previous dissemination

This manuscript is a substantially rewritten English-language case report derived from the author's 2021 postgraduate thesis, "Reabilitação estética conservadora na substituição de laminados cerâmicos: um relato de caso," deposited on Zenodo under DOI 10.5281/zenodo.20669726. The thesis has not been represented here as a previously peer-reviewed journal article.

Statements and Declarations

Funding

This work received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Potential Competing Interests

The author declares no potential competing interests related to this manuscript.

Author Contributions

Marcelo Barboza Borille: Conceptualization; Investigation; Methodology; Resources; Visualization; Writing – original draft; Writing – review and editing; Project administration. The author approved the final manuscript and accepts responsibility for its content.

Data Availability

The de-identified clinical information supporting this case is contained in the article. Additional clinical photographs are not deposited as open data because they may permit patient identification and will be shared only when compatible with the patient's consent and applicable ethical and legal requirements. The thesis from which this manuscript was derived is available at <https://doi.org/10.5281/zenodo.20669726>. A related clinical protocol is associated with <https://doi.org/10.17504/protocols.io.eq2lymw7rlx9/v1>.

Ethics

This case report was approved by the Research Ethics Committee of Centro de Pesquisas Odontológicas São Leopoldo Mandic Ltda., Brazil, under approval No. 4.915.152 and CAAE 50092121.5.0000.5374, on August 18, 2021. The study was conducted in accordance with applicable ethical standards and Brazilian National Health Council Resolution No. 466/2012.

Consent for Publication

Written informed consent was obtained from the patient for participation and for publication of the clinical information and photographs included in this report.

Use of Generative AI

OpenAI ChatGPT was used to assist with English-language editing, structural organization according to the CARE framework, and reference formatting. It was not used to generate or alter clinical data or images. The author reviewed the manuscript, verified the clinical content against the source record, and accepts full responsibility for the final text.

Acknowledgements

The author thanks Prof. Dr. Guilherme Anziliero Arossi for supervision of the postgraduate thesis from which this manuscript was developed.

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Declarations

Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.