

## CASE REPORT

# Restoration of gingival recession with periodontal preformed composite veneers

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**Abstract**

Recovery from periodontal disease is not completed until the esthetic sequelae of the disease have been restored. This paper introduces a new technique to restore the natural appearance of the smile in a periodontal patient in a single appointment.

**KEYWORDS**

direct composite, gingival recession, indirect ceramic, periodontal disease, preformed veneer, restorative dentistry

## 1 | INTRODUCTION

A patient with large gingival recessions due to a history of severe periodontal disease was restored to proper esthetics and function using preformed composite veneers. This technique bridges the gap between conventional direct and indirect techniques for minimally invasive restoration of gingival recession.

Since 1956 when Grupe and Warren introduced the laterally positioned pedicle graft technique, several procedures have been developed for surgical and nonsurgical treatment of gingival recession.<sup>1-4</sup> When surgical treatment is indicated, the coronally advanced flap with subepithelial connective tissue graft is considered the gold standard due to the highly predictable and durable results.<sup>5,6</sup> However, surgical treatment is not always a viable option or an option that the patient wishes to pursue and direct composite is a popular alternative for minimally invasive restoration of gingival recession.<sup>7-9</sup> Direct composite covers the exposed root and restores the gingival recession in a single appointment with a fast and predictable technique. However, successful direct composite restoration depends on the size of the recession because clinical studies show that large cervical composite restorations have a much higher failure rate than small restorations.<sup>10-12</sup> Another limitation is when the gingival recession is associated with

open space in the gingival embrasure (also known as black triangle) because it takes advanced sculpting and finishing skills to restore the gingival recession with freehand composite and close the black triangle producing ideal emergence profile, accurate contact point location, and optimal cleansability. Unfortunately, the association of gingival recession and black triangle is not uncommon in severe periodontal patients where also grafting procedures are frequently not indicated because the loss of interdental attachment reduces or even impairs the potential for surgical root coverage.<sup>13-15</sup> When neither gingival grafting nor direct composite are indicated, the patient is left with the only option of invasive and complicated indirect restoration to cover the exposed root and recreate the natural appearance of the smile.<sup>16-18</sup>

This paper introduces an alternative treatment option to restore a severe periodontal patient with large gingival recessions using periodontal preformed composite veneers. Preformed composite veneers are preshaped, prepolished composite laminates available in different shapes and sizes for direct bonding to the deserving tooth with a complementary shade-matched composite resin.<sup>19-21</sup> Preformed composite veneers are now available also in a periodontal version with shape and size designed to fit the periodontal dentition. This paper presents the application of periodontal preformed veneers for restoration of a patient with Miller class IV gingival recessions associated with black triangles. Despite the

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long clinical crowns and the large open spaces in the gingival embrasures, the periodontal preformed veneer showed close adaptation to the teeth and produced a restoration with proper size, accurate anatomy and glossy surface in a single appointment with minimally invasive tooth preparation and reduced stress for the soft tissue.

## 2 | CASE REPORT

The patient was a 53 years old man referred by the periodontist for esthetic treatment of the upper front teeth. The patient was currently in a periodontal maintenance program after completion of full mouth implant-supported restoration. His primary esthetic complaint was the multiple gingival recessions on the upper front teeth associated with large black triangles in the gingival embrasures. Secondary complaints were the stained teeth with discolored vertical craze lines, visible cervical composite restorations, and dentin hypersensitivity persisting despite treatment with dentin tubule blockers and nerve desensitizing agents. Clinical and radiological examination (Figures 1 and 2) revealed Miller class IV gingival recessions, large black triangles, papilla height apical to the CEJ with reduced residual gingival scalloping. Periodontal records showed no tooth mobility, no pocket probing in excess of 3 mm, and no signs of gingival inflammation (Figure 3).

Dental history revealed severe periodontal disease associated with anterior occlusal trauma due to loss of posterior teeth. The association of periodontal disease and occlusal trauma was the main etiologic factor for the occurrence of the gingival recessions.<sup>22-24</sup> Only once the etiologic factor was successfully managed in the initial periodontal and prosthodontic treatment phase, the second part of the treatment could be started focusing on the esthetic and functional restoration of the gingival recessions. The available treatment options for restoration of the gingival recessions were discussed with



**FIGURE 1** Preoperative picture showing severe gingival recessions and large black triangles in the gingival embrasures

the patient including surgical treatment, combination of restorative and surgical treatment, and restorative treatment. Surgical treatment alone or in combination with restorative treatment (ie restoration of the noncarious cervical lesions followed by a tissue graft to improve the esthetic outcome and to increase tissue thickness) was not considered a viable option for this patient because the presence of Miller class IV gingival recessions impaired the potential for full root coverage.<sup>25,26</sup> In addition, the presence of a persisting heavy smoking habit was a potential risk factor since cigarette smoking is known to adversely affect wound healing of subepithelial connective tissue grafts.<sup>27,28</sup> Another critical factor for successful surgical root coverage was the thin and scalloped gingival biotype.<sup>29-31</sup>

After considering all the available treatment options, a final decision was made to restore teeth 13-23 with periodontal preformed composite veneers. The main decisional criteria for selecting the preformed veneer technique were the minimally invasive tooth preparation and the single-appointment clinical procedure with minimal stress for the delicate soft tissue of the patient.

Once the patient approved the treatment plan with Periodontal Preformed Veneers, the clinical procedure started with selecting the size of the veneers. The periodontal veneers for the patient in this report (Edelweiss Long Veneers, Edelweiss Dentistry) are available in three sizes (S, M, L) and a custom sizing guide is included in the system to select the veneer that best fits the teeth to be restored (Figure 4A,B). The size of Edelweiss Veneers is based on average tooth dimensions in the human population and fits most of the patients. However, chairside customization with standard composite instruments is possible to accommodate specific size requirements. For the patient in this report, size M was selected and no size adjustment was required.

After choosing veneer size, next step was veneer shade selection. The Edelweiss System includes a nanohybrid composite available in several dentin and enamel colors to cement the veneers (Edelweiss NH, Edelweiss Dentistry). Composite color selection is a critical step for successful restoration with Edelweiss Veneer because the laminate is fabricated with a colorless enamel shade and the final color of the veneer is determined by the color of the luting composite. For the patient in this report, tooth shade was measured with a digital spectrophotometer (SpectroShade Micro, MHT Optic Research) and double checked for patient approval using the Edelweiss custom color guide under 6500K light conditions (Figure 5). Tooth shade was VITA A3 and the selected Edelweiss NH composite shade for veneer cementation was A3.5 in the gingival third, A3 in the middle third, Enamel shade in the incisal third. An opalescent tint (Effect Blue, Edelweiss Dentistry) was used to increase incisal translucency and halo effect. The



FIGURE 2 Periapical X-rays showing severe bone loss. (X-rays taken at the beginning of the periodontal treatment)

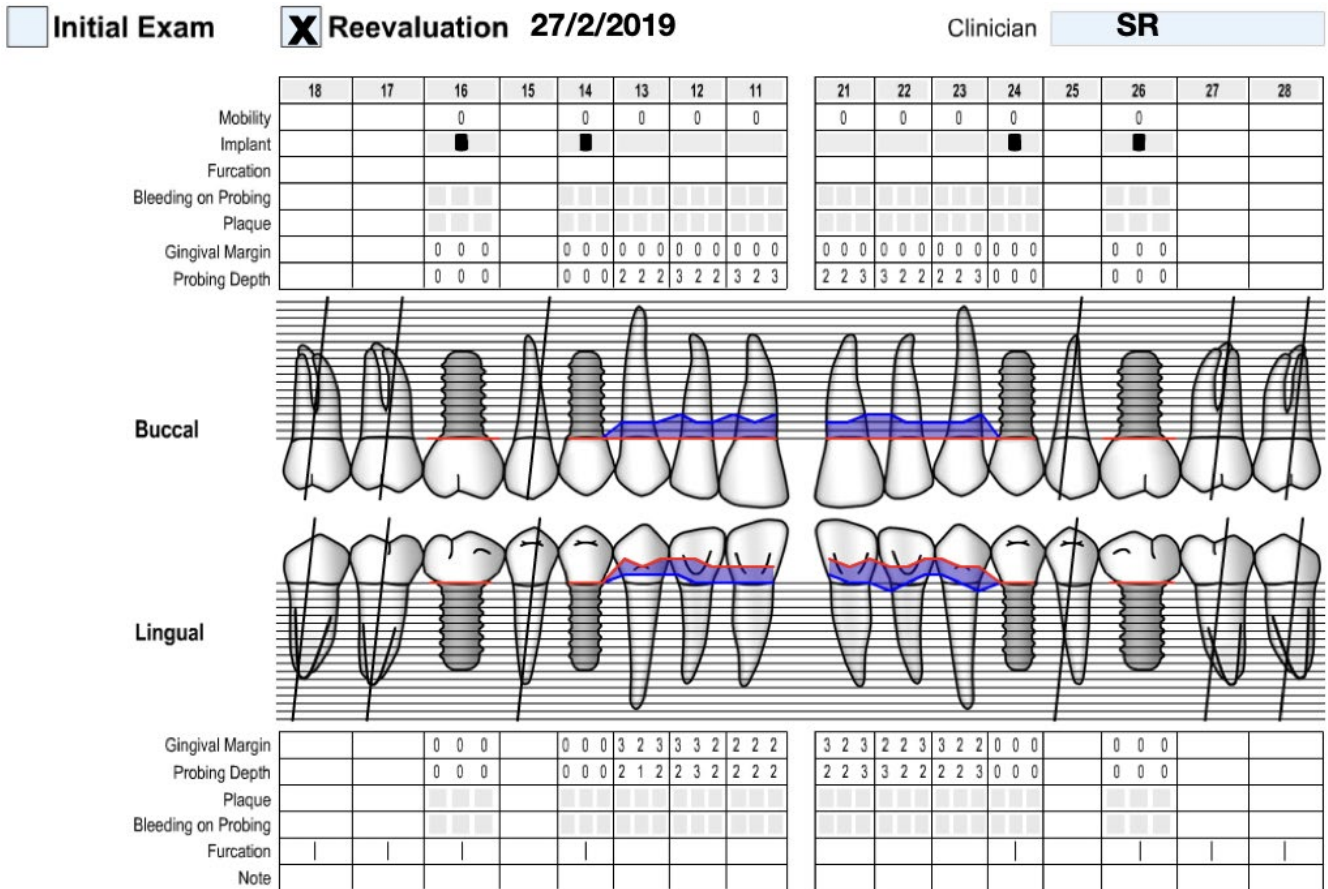
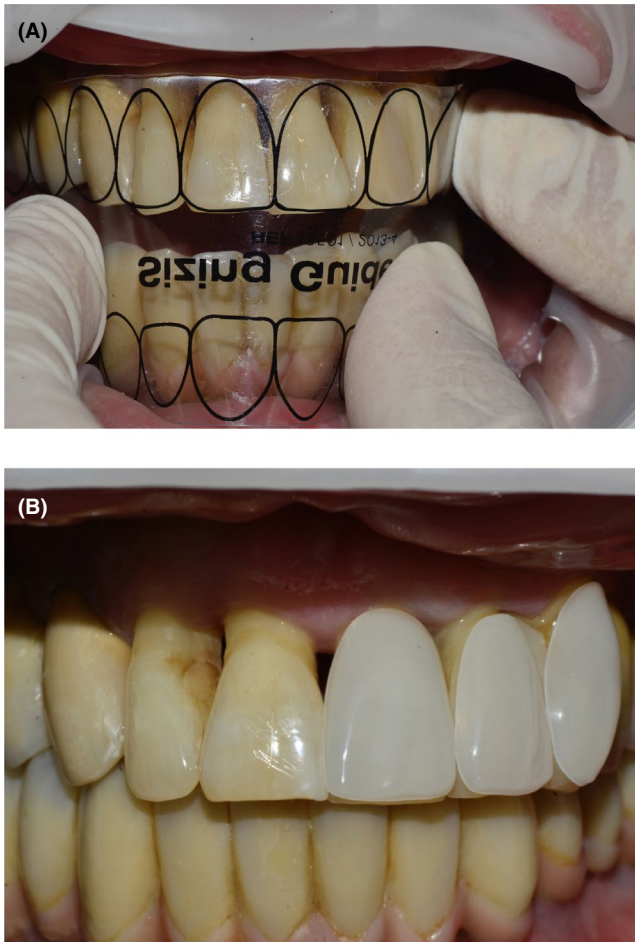


FIGURE 3 Preoperative periodontal records

purpose of using multiple composite shades was to produce progressive chroma gradation from gingival to incisal and to reduce the apparent tooth length.

After choosing veneer size and color, the teeth were ready for veneer preparation. Edelweiss Veneers are fabricated with an average thickness 0.5 mm and standard tooth



**FIGURE 4** A, Edelweiss Long Veneer size selection using the Edelweiss sizing guide. B, Edelweiss Long Veneer try-in to confirm the size selection



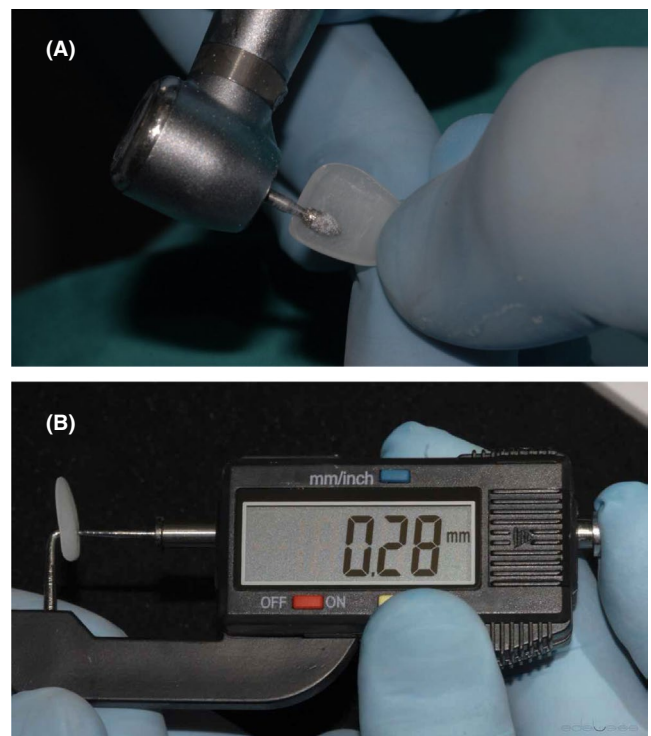
**FIGURE 5** Edelweiss custom shade guide to check the color of the luting composite

preparation requires minimally invasive 0.5 mm reduction of the buccal enamel. However, when maximum tooth preservation is required (young patients, healthy teeth with no previous restorations...), the thickness of the veneer can

be further reduced to allow even more conservative tooth preparation. In the case presented in this report, the thickness of the veneer was reduced to 0.3 mm using a football shape diamond bur (8379, Komet USA) and a digital thickness gauge (Digital Thickness Gauge, SMT Messzeuge) to control the residual veneer thickness (Figure 6). Now a round chamfer diamond bur (8882L, Komet USA) was used to reduce the buccal surface of the tooth 0.3 mm with supragingival margins. In order to allow maximum hard tissue preservation, tooth preparation included no incisal overlap, no opening of the interproximal contacts, and no extension of tooth preparation in the gingival embrasure (Figure 7).

Following the minimally invasive preparation, teeth were ready for delivery of the veneers. Since the margins of the preparation were located supragingivally and the soft tissue was healthy with no risk of bleeding, field isolation with check retractors (Optrate, Ivoclar) was considered safe and effective for this patient. Rubber dam would have provided a more complete field isolation but also involved the risk of triggering retraction of the delicate soft tissue due to the trauma from the metal clamp.<sup>32,33</sup>

An additional step before bonding the veneers was sandblasting of dentin and enamel with 50  $\mu$ m aluminum oxide using an intraoral air-abrasion device (MicroEtcher CD, Danville Engineering) at a pressure of 2.5 bar from a distance of approximately 10 mm for 10 seconds. Following particle



**FIGURE 6** A, The thickness of Edelweiss Veneer was reduced to allow maximum hard tissue preservation. B, Edelweiss Veneer thickness checked with a digital thickness gauge



**FIGURE 7** Minimally invasive veneer preparation with no incisal overlap, no opening of the interproximal contacts, and no tooth preparation in the gingival embrasure

abrasion, the tooth was thoroughly water rinsed and air dried. Sandblasting enhances bond strengths by improving dentin tag formation in the sclerotic cervical dentin and by removing the enamel aprismatic layer beyond the margins of the preparation.<sup>34-36</sup>

After sandblasting, the tooth was etched with 37% H<sub>3</sub>PO<sub>4</sub> (Gel Etchant, KerrHawe) for 30 seconds (Figure 8) followed by water rinsing for 30 seconds and application of a single-step adhesive according to the manufacturer instructions (Peak Universal, Ultradent). The intaglio of the veneer was conditioned with a dedicated resin primer (Veneer Bond, Edelweiss Dentistry) applied with a microbrush and light cured 20 seconds (Figure 9). No acid-etching, no sandblasting, and no silane application are required inside Edelweiss Veneer. However, the manufacturer recommends conditioning with Veneer Bond in order to promote chemical adhesion and to increase bond strength between the highly inorganic laminate and the luting composite.

After Veneer Bond application, the veneer was loaded with the selected composite shades (Figure 10) and gently



**FIGURE 8** Tooth etching with 37% H<sub>3</sub>PO<sub>4</sub>

pressed in position until it contacts the adjacent teeth. The extra composite was removed from the margins and carefully sculpted with a thin spatula (CompoSculp DD 9/10, Hu-Friedy) to achieve optimal adaptation between the veneer and the tooth (Figure 11). After checking the correct position on the tooth, the veneer was light cured 40 seconds using a high-power curing light (Demi Plus, Kerr Corporation). Finally, the margins of the veneer were finished and polished with composite finishing disks (Sof-Lex XT, 3M ESPE) and interproximal finishing strips (Sof-Lex, 3M ESPE) followed by a diamond-impregnated silicone cup (Dia step 2, Ravelli) at 300-500 ref (g force) under water to produce the final luster (Figure 12). No finishing and no polishing were required on the buccal surface since Edelweiss veneers are preshaped and prepolished to ideal anatomic form with accurate superficial anatomy and highly glossy surface.

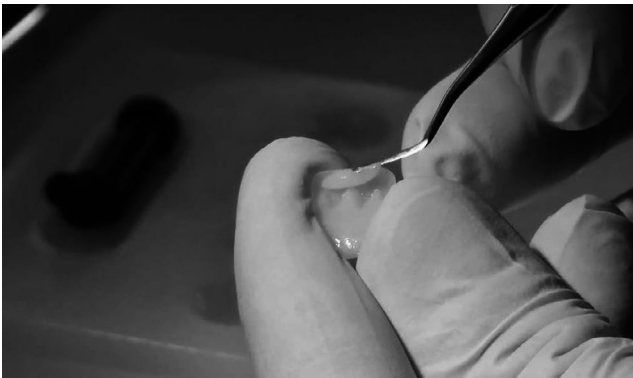
The step-by-step clinical procedure is summarized in Table 1. The total clinical time for each veneer was 20 minutes.

The same step-by-step procedure was followed for teeth from #13 to #23 starting from the central incisors and moving distal to the laterals and the canines. Tooth #13 was a metal-composite crown and Edelweiss Veneer was bonded to the crown following the same step-by-step clinical procedure but with different tooth surface conditioning. Tooth conditioning for the metal-composite crown was accomplished according to the following protocol: (a) air abrasion with 30 μm silica-coated aluminum oxide particles (CoJet Sand, 3M ESPE) using an intraoral air-abrasion device (Microetcher CD, Danville Engineering) at a pressure of 2.5 bar from a distance of approximately 10 mm for 10 seconds, (b) coating with a 3-methacryloxypropyl trimethoxysilane coupling agent (ESPE-Sil, 3M ESPE), and (c) application of a single-component bonding agent (Peak Universal, Ultradent) according to the manufacturer recommendations and light cured for 20 seconds. In order to provide better visualization of the margins of the crown, a thin retraction cord (Ultrapack size 00, Ultradent) was packed around tooth # 13 before seating the veneer.

Once all the veneers were bonded in position and the occlusal contacts were checked in lateral and protrusive movements, the patient was dismissed and rescheduled for postoperative evaluation 4 weeks later. At the recall appointment, functional evaluation (absence of fractures, marginal adaptation), biological evaluation (soft tissue response, postoperative sensitivity), and esthetic evaluation (gloss, color matching) were completed and resulted fully satisfactory (Figure 13). At the 4 weeks, control periodontal records revealed positive periodontal response (Figure 14) and a panoramic X-ray showed successful integration of the restorations (Figure 15). The patient was happy with the esthetic outcome and reported that hypersensitivity finally disappeared after placing the veneer. The patient continued the periodontal maintenance program and returned for a new control appointment 12 months later.



**FIGURE 9** The intaglio of Edelweiss Veneer conditioned with Edelweiss Veneer Bond to promote chemical adhesion between the highly inorganic laminate and the luting composite



**FIGURE 10** Veneer loaded with the selected composite shades



**FIGURE 12** The margins of the veneer finished and polished with composite Instruments



**FIGURE 11** The extra composite carefully sculpted with a thin spatula to achieve optimal adaptation between the veneer and the tooth

At the 12-month recall examination, the veneers were fully functional with no marginal discoloration and superficial

luster comparable to the adjacent teeth (Figure 16). New periodontal records were registered revealing optimal biological integration (Figure 17).

### 3 | DISCUSSION

The prefabricated composite veneer technique was originally launched in the late 1970s (Mystique Veneer System, Caulk Dentsply) but with limited success because the large glass filler technology available at the time did not provide adequate esthetics and durability.<sup>37-39</sup> However, the concept of prefabricated veneer was rejuvenated 40 years later thanks to the introduction of more advanced composite resin with improved mechanical and esthetic properties. The Edelweiss Veneers used for the patient in this report are the first of this “new generation” of prefabricated veneers introduced on the

**TABLE 1** Edelweiss Veneer step-by-step clinical procedure

1. Select veneer size (use the custom sizing guide)
2. Select composite shade (use the custom shade guide)
3. Al<sub>2</sub>O<sub>3</sub> sandblasting dentin and enamel, 10 s (optional)
4. H<sub>3</sub>PO<sub>4</sub> acid etching enamel and dentin, 20 s
5. Water rinsing 30 s
6. Adhesive on enamel and dentin
7. Resin primer on the intaglio of the veneer (Veneer Bond, light cured 20 s)
8. Selected composite shade (Edelweiss NH) loaded inside the veneer
9. Light cure the veneer in position, 40 s
10. Finishing and polishing the margins with composite instruments (margins only)
11. Check occlusion

**FIGURE 13** Postoperative picture of the veneers after 4 wk showing successful esthetic integration

market in 2011. Edelweiss Veneers are manufactured with a nanohybrid composite resin and feature an innovative fabrication technology with heat/pressure curing and laser sintering that provides excellent performance and resistance to fatigue in laboratory testing.<sup>40</sup> Recently, a variation of the standard Edelweiss Veneer was introduced for treatment of periodontal patients (Edelweiss Long Veneer). Edelweiss Long Veneer features extra crown length to fit elongated teeth with gingival recession and a wraparound shape with the contact point relocated in the gingival third to reduce the distance from the bone crest and facilitate the papilla to fill the open gingival embrasure.<sup>41-43</sup> Open gingival embrasure with black triangle formation is a frequent complaint in periodontal patients associated with speech impairment, food entrapment, and compromised esthetic especially in smiles with high lip line. A black triangle can be partially or totally closed with a full coverage/partial coverage indirect restoration but requires a more aggressive tooth preparation to bypass the large undercuts created by the triangular periodontal

tooth shape.<sup>44,45</sup> A benefit of the periodontal preformed veneer is the direct technique that does not require to remove the undercuts and fills the gingival embrasure with no need for tooth preparation in the interproximal space. The less invasive tooth preparation is not secondary benefit because many periodontal patients are relatively young and the choice of restoration should be carefully evaluated for its lifespan and the need to be maintained and replaced throughout the patient's life.

Another benefit of the periodontal preformed veneer technique is the combination of minimal thickness and high translucency of the composite laminate producing optimal contact lens effect and invisible margin. The invisible margin can be conveniently positioned supragingivally with reduced trauma for the soft tissue and improved periodontal response.<sup>46-48</sup> Periodontal response was notably good in the presented case as demonstrated by the healthy soft tissue and positive periodontal records at the 12-month recall. This was likely resulting from the supragingival margin location as well as from the single-appointment technique with reduced number of clinical steps and limited stress for the soft tissue (no soft tissue retraction, no impression taking, no temporary placement/removal). Unfortunately, even with atraumatic clinical procedure and with supragingival margin location, the delicate soft tissue of a periodontal patient is always susceptible of apical migration especially in thin and scalloped gingival biotype.<sup>49,50</sup> This is a significant limitation for traditional indirect ceramic restoration because soft tissue migration could lead to esthetic failure and need to prematurely replace the restoration due to exposed margins and open space in the gingival embrasure. A benefit of the preformed composite veneer is the possible intraoral repair using direct composite with no need to replace the restoration in case of soft tissue migration. Intraoral repair is a critical factor for successful anterior restoration in periodontal patients because allows minimally invasive intervention as opposed to replacement with many biological and financial benefits for the patient. In recent years, the advancements in composite-to-composite adhesive techniques have favored an increasing change in practice to perform composite intraoral repair.<sup>51-55</sup> Many clinical studies have shown successful long-term outcomes reinforcing the indication for this restoration maintenance strategy.<sup>56-59</sup>

The possible intraoral repair, the minimally invasive tooth preparation, and the convenient single-appointment clinical procedure were the main benefits of the periodontal preformed veneer technique for the patient presented in this report. Nevertheless, the technique showed some limitations including the advanced finishing and polishing skills needed to produce a smooth transition between the veneer and the tooth. Even if the preformed veneer technique does not require the dentist to sculpt ideal anatomic form and to produce a highly glossy surface, the margins of the Edelweiss Veneer

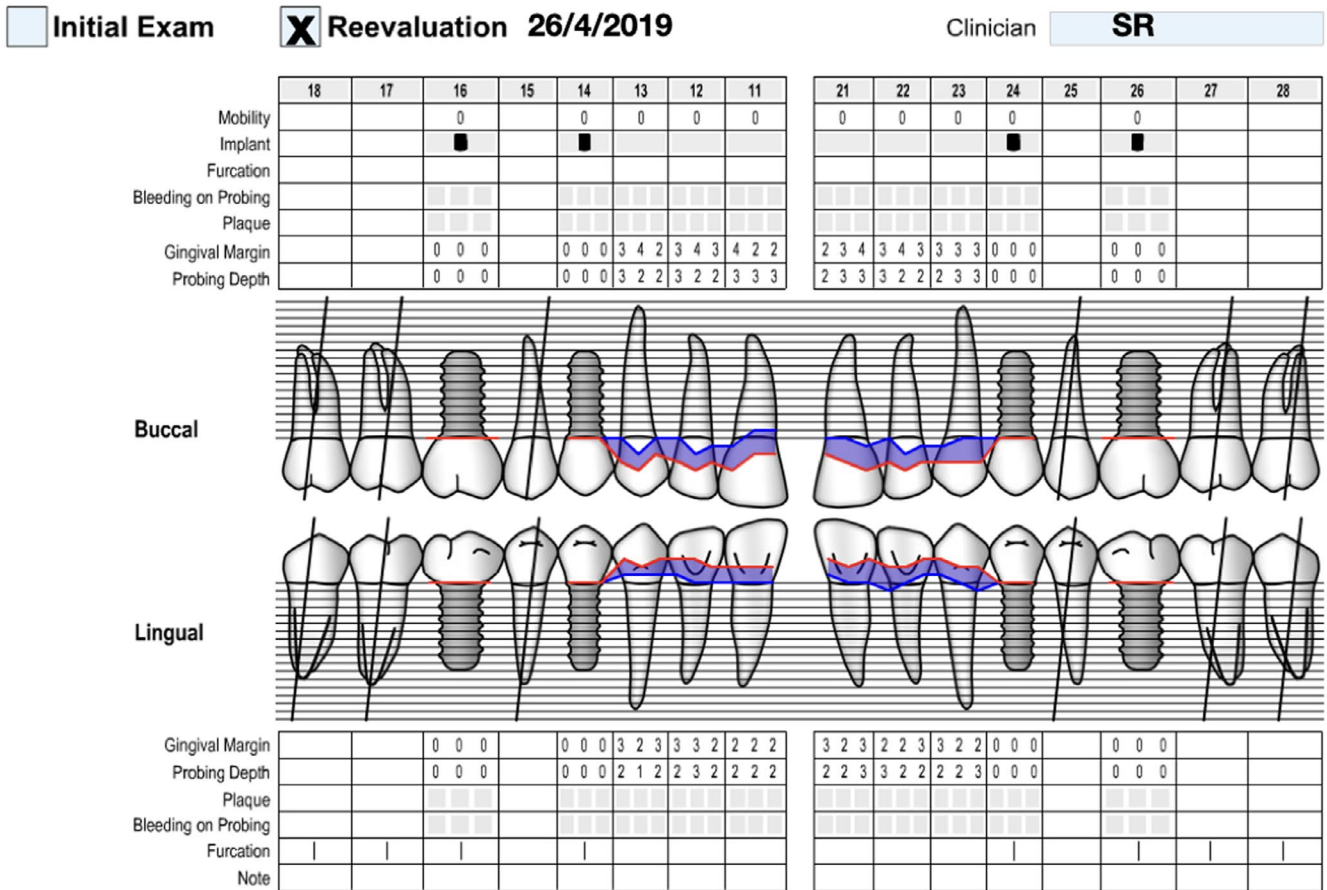


FIGURE 14 Postoperative periodontal records after 4 wk



FIGURE 15 Postoperative X-ray control after 4 wk



FIGURE 16 Postoperative pictures of the veneers after 12 mo

still have to be carefully finished and polished in order to produce optimal soft tissue response especially in the critical interproximal area.

Another limitation was the lack of clinical studies comparing the durability of this technique with the alternative restorative techniques. The available clinical studies<sup>60,61</sup> show very good results, and in laboratory testing, Edelweiss Veneers provides excellent performance and resistance to fatigue<sup>40</sup> but is still unknown yet how this restoration compares with indirect ceramic that is considered the gold standard

for anterior restoration. It is possible that the durability of Edelweiss Veneers does not match the durability of indirect ceramic but the concept of successful restoration in a case like the periodontal patient in this report embraces also other factors including hard tissue preservation, reduced soft tissue trauma, possible intraoral repair, and affordable financial cost. It is up to the dentist to balance all the factors and select the best treatment for the patient. Balancing all the factors



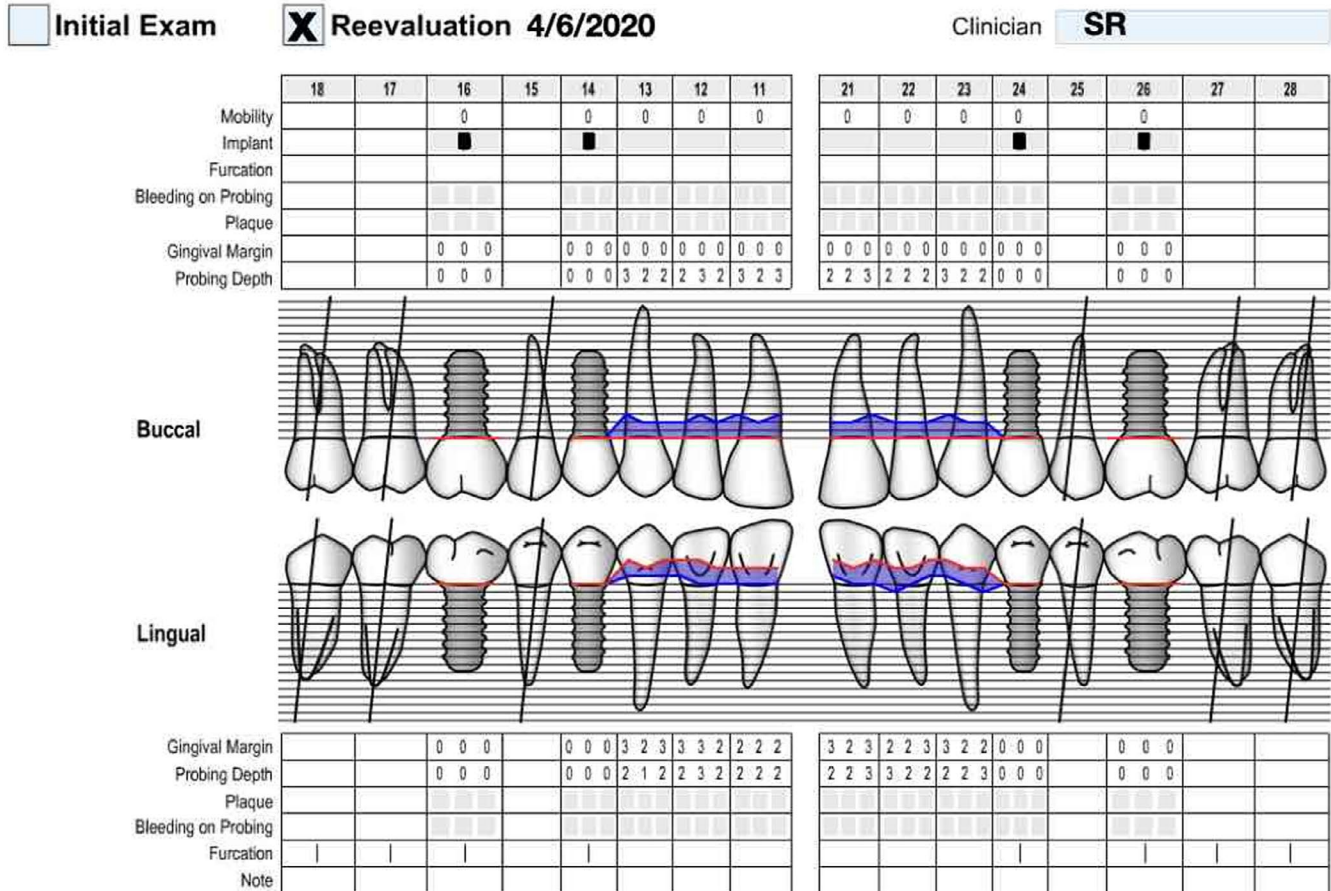


FIGURE 17 Periodontal records after 12 mo

is even more critical today because the increased frequency of gingival recessions in the adult population brings a larger variety of esthetic and functional needs to be addressed in the restorative phase of the treatment. In this phase, a wider range of restorative treatment options is recommended for the dentist in order to successfully meet each patient's needs and expectations. The Periodontal Preformed Veneer technique implements the traditional choice of either direct or indirect restoration and introduces an alternative technique for single-appointment restoration of gingival recession with minimally invasive tooth preparation and minimal stress for the soft tissue.

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#### CONFLICT OF INTEREST

The author Claudio Novelli is a scientific consultant for Edelweiss Dentistry. No funding was provided by Edelweiss Dentistry for the completion of this study.

#### AUTHOR CONTRIBUTIONS

CN: contributed to conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing and review.; visualization, supervision, and project administration.

#### ETHICAL APPROVAL

The patient described in the case report was fully informed on the method and the purpose of the clinical study. Written consent to participate and for publication was obtained by the patient and is available upon request.

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