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Prefabricated Composite Veneers: An Efficient Alternative in Smile Aesthetic Rehabilitation-A Case Report

Fabio Herrmann Coelho-de-Souza[1]*, Helena Fagundes[2], Pedro Villela de Andrade Melecchi[3] and Lucas Silveira Machado[1]

[1]*Department of Conservative Dentistry. Federal University of Rio Grande do Sul, Porto Alegre, Brazil*

[2]*Undergraduate student at Federal University of Rio Grande do Sul, Brazil*

[3]*DDS, Post Graduate student at Federal University of Rio Grande do Sul, Brazil*

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***Corresponding author:** Fabio Herrmann Coelho-de-Souza Department of Conservative Dentistry, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

Abstract

The aim of this case report is to outline the step-by-step process of aesthetic smile rehabilitation technique employing prefabricated composite resin veneers, along with their advantages and limitations. The challenges of direct composite resin restorations and indirect ceramic restorations have spurred the development and enhancement of new restorative options, such as prefabricated composite veneer restorations. The clinical case reported illustrates the clinical steps for this recommended alternative technique suitable for cases involving diastema closure, changes in tooth colour and shape, among other indications akin to conventional ceramic veneers. The proposed treatment utilizing prefabricated composite veneers demonstrated immediate satisfactory outcomes. Moreover, the reduced clinical time and fewer sessions suggest it to be a simplified technique in comparison to direct veneers, and significantly lower costs due to independence from dental laboratories, being a viable alternative to indirect ceramic restorations. Although it serves as a tangible treatment option for aesthetic rehabilitations, the technique still encounters some limitations, such as: adaptation difficulties and operator skills. The six prefabricated composite veneers used on the patient could improve the smile appearance and his self-esteem. Even though the one-year follow-up revealed a good performance overtime, further long-term studies are imperative to evaluate the longevity of these restorations.

Keywords: Dental veneer; Aesthetic; Rehabilitation; Composite resins

Introduction

In recent years, there has been a remarkable surge in the pursuit of dental procedures focused on aesthetics and dental rehabilitation [1-3]. This trend has propelled dentistry toward continual improvement, encouraging the market to seek constantly the development of new materials and techniques to ensure the success of these rehabilitations. The remarkable evolution of aesthetic restorative materials over recent decades has prominently featured composite resins and ceramics as frequent protagonists in the creation of both direct and indirect aesthetic veneers, aiming to aesthetically rehabilitate smiles [3-8]. Technological advancement and rapid progress in dental materials have facilitated increasingly less invasive treatments, often dispensing or requiring minimal intervention in dental structures [1,2,7,8]. Among the materials available for smile aesthetic rehabilitation, composite resins and ceramics stand out, evolving significantly over time. However, the choice between them, as well as the technique employed, relies on the specifics of each case, the practitioner's expertise, and the individual characteristics of each patient [3,4,7]. Regarding the techniques employed, these can be classified as direct or indirect, determined by the uniqueness of each clinical case, the skill of the dentist, and the patient's peculiarities. The most widely diffused and prominent indirect technique in the market involves the use of ceramics as the material of choice, applied, injected, or milled via the CAD-CAM technique [4]. Nevertheless, alongside ceramic materials, similar proposals made from composite resin are available, referred to as prefabricated composite resin veneers [8-11].

Although direct composite resin veneers have shown satisfactory outcomes in longitudinal evaluations [12], they are reliant on the operator's skill and may pose significant technical

challenges, especially when considering multiple restorations in extensive rehabilitations. In this context, prefabricated veneers emerge as an alternative, simplifying the technique. They forego the need for taking impressions, cast model construction, and temporary restorations, reducing costs while still delivering satisfactory results. Prefabricated veneers are recommended for restoring smile harmony, aiming to swiftly preserve dental structure, aligning with the aesthetic possibilities that this approach offers [8-11]. The prefabricated veneers available in the market are thin lenses made of composite resin, featuring predetermined sizes, shapes, and colours. These veneers need to be adapted to the teeth and cemented using photoactivated composite resin. With lower costs than traditional ceramic laminates and the potential to be applied in a reduced number of clinical sessions, they can be employed in certain cases for adjustments in shape, size, and colour, contributing to smile harmony [9,10]. Therefore, considering the necessity for a detailed exposition of this technique, particularly due to the scarcity of studies on the topic, this work aims to report a clinical case of smile rehabilitation using prefabricated composite resin veneers, without traditional dental preparation. This report will encompass all clinical steps, from diagnosis to case conclusion, including an one-year follow-up.

Case Report

A 25-year-old patient, male, with aesthetic demands, showed small anatomic crowns with diastemas among the upper anterior teeth. A thorough clinical examination aided by radiographic imaging was carried out. The examination assessed gingival health, adjacent soft tissues, absence of caries activity, and dental structure characteristics (Figure 1-3). A prophylaxis with extra-fine pumice and water was performed on the tooth surfaces before receiving the prefabricated veneers, eliminating all extrinsic residues and bacterial plaque. The veneer colour was chosen following the manufacturer's guidelines, with proper lighting through ambient light, reflector turned off, and hydrated teeth. The shape of the prefabricated veneers was selected using a contour guide offering distinct shapes and sizes. From this guide, the most suitable option for the case was determined (Figure 4-6). The prefabricated composite veneer system used was Componeer (COLTÈNE, Altstätten, Switzerland) was chosen the material of choice. The Componeer Contour and teeth size guide was used to determine the appropriate Componeer sizes. For eight upper and eight lower teeth. "L" size componeer was selected for the central incisors, "M" size for the lateral incisors, "L" size for canine and "M" size for premolar was chosen Proper shape, size and colour of individual teeth was recorded and Componeer veneer was chosen properly. The Componeer Contour and teeth size guide was used to determine the appropriate Componeer sizes. "M" size componeer was selected for the central incisors, lateral incisors and canines (Figure 7). A minimally invasive technique with minimal dental preparation was proposed, anesthesia was not required. Tapered diamond burs (#2135) at high speed and abrasive discs were used for minimal enamel removal, aiming to adjust volume and to eliminate convex areas that would hinder veneer adaptation (Figure 8-9). Fine diamond burs (F and FF grits) also helped provide a smoother and regular enamel surface. Each veneer was individually tested, and any irregularities or potential misfits were removed and smoothed with abrasive discs and rubber points (figure 10). Once checked individually, the veneers were tested collectively to approximate the final result and harmony. The prefabricated veneers were cleaned with 37% phosphoric acid (Ultra-Etch - Ultradent) for 30 seconds, washed and dried. Then, an adhesive coat was applied using a microbrush on the veneer's internal surface, without photoactivation (Figure 11-12).

Figure 1: Initial smile appearence.

Cementation was performed two-by-two, starting with central incisors, progressing to laterals and canines, signifying adhesive application tooth-by-tooth. A polyester (mylar) matrix was utilized during the adhesive technique to protect adjacent teeth, preparing only the teeth receiving cementation. The chosen adhesive system was the total-etch ScotchBond Multi-Purpose (3M ESPE). It involved enamel etching with 37% phosphoric acid (Ultra-Etch - Ultradent) for 30 seconds, washed, dried and followed by adhesive application without photopolymerization (Figure 13-14). Due to the extremely thin thickness of prefabricated veneers and

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their consequent translucency, the cementation material colour influences the final chromatic outcome. One way to address this challenge is by utilizing conventional light-curing composite resins, ensuring greater colour predictability, time, and reduced technical sensitivity for material manipulation. It is crucial to notice the importance of prior colour try-in before cementation. Filtek Z350 XT composite resin in shade A1B (3M - ESPE) was used for veneer cementation, to achieve the desired final "tooth-resin-veneer" ensemble colour. After material selection, cementation initially began with central incisors, applying the composite resin in the correct quantity to the veneer's inner face (Figure 15). The material was adapted with a microbrush to fill the veneer entirely and directed toward the tooth in the correct alignment. The veneers were delicately pressed against the prepared tooth to facilitate the composite flow, leading to excesses (overhang) around their perimeter (Figure 16). Before photopolymerization, overhang material was removed using a brush, dental spatulas and an explorer probe (Figure 17), followed by lightcuring by LED (Figure 18). The removal of the remaining overhang after lightactivation was performed using a no. 12 surgical scalpel blade (Figure 19) and discs (Figure 20, Sof-Lex, 3M - ESPE). The finishing of the cervical area was done with a fine diamond bur (#3195F – Figure 21). Following the completion of teeth 11 and 21, the same protocol was applied to lateral incisors (Figure 22) and canines. Besides the aforementioned instruments, an epitex abrasive strip (GC) was used for proximal finishing. A fine diamond bur (#3195F) was used for finishing the cervical area of the lateral incisors and canines (Figure 23) and rubber points were employed for polishing the cementation line, concluding the cementation process. After an occlusion analysis, Figures 24-26 show the final view of the smile rehabilitation. Figure 27 reveals the smile image of one-year follow-up.

Figure 2: Initial frontal view.

Figure 3: Initial, lateral view.

Discussion

The focus of the current article was to describe and analyse the outcomes obtained from a clinical case of aesthetic smile rehabilitation using prefabricated composite resin veneers, detailing the clinical procedures from diagnosis to case completion, including a one-year follow-up. The presented clinical case exhibited satisfactory aesthetic and functional results, following the application of prefabricated composite resin veneers. Initially, the patient expressed aesthetic concerns related to the appearance of their anterior teeth, seeking a solution to enhance the harmony of their smile. Following a comprehensive assessment, the use of prefabricated composite veneers was

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chosen due to their aesthetic properties, reduced invasiveness, and lower cost, compared to traditional ceramic laminate veneers [8-10,13]. Throughout the treatment, the prefabricated composite resin veneers were meticulously selected and adapted to the patient's teeth, considering appropriate size, shape, and colour to achieve the desired harmony. In the cementation technique, photoactivated composite resin was employed to ensure effective and durable adhesion [8-10,13]. The aesthetic outcomes achieved in the current clinical case were evaluated as highly satisfactory. The prefabricated composite veneers demonstrated effectiveness in enhancing the appearance of the restored teeth, providing aesthetic harmony of the patient's smile. Furthermore, the patient's function was restored, and appropriate occlusal adaptation was achieved.

Figure 4: Size selection using contour guide for central incisor.

Figure 5: Size selection using contour guide for lateral incisor.

Figure 6: Size selection using contour guide for canines.

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Figure 7: Selection of prefabricated veneers.

Figure 8: A fine diamond bur used to prepair the tooth to receive the veneers (extra volume).

Figure 9: An abrasive disk used to smooth the enamel surface to receive the veneers (round angles and volume).

Figure 10: Adjustments to improve the adaptation of the prefabricated veneer with an abrasive disk.

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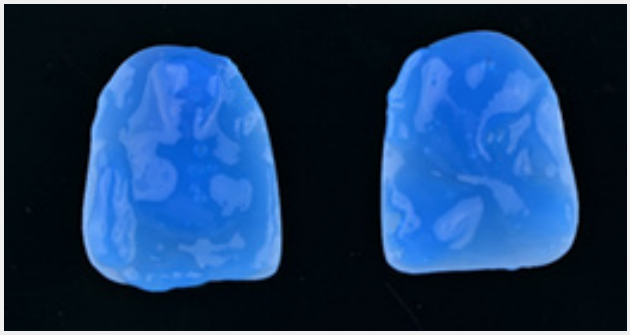

Figure 11: Veneers were cleaned with phosphoric acid.

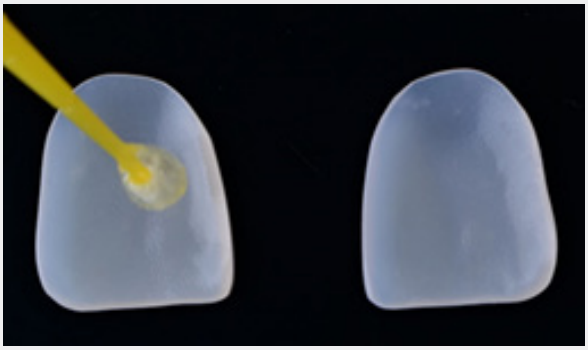

Figure 12: Application of the adhesive on veneers.

Figure 13: Enamel surface were etched with phosphoric acid.

Figure 14: Application of the adhesive on enamel.

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Figure 15: Composite resin was applied on the internal surface of the prefabricated veneer.

Figure 16: Positioning of the veneers. The restorations were aligned with the midline and the incisal position checked prior to light-curing.

Figure 17: Overhang material was removed before lightcuring.

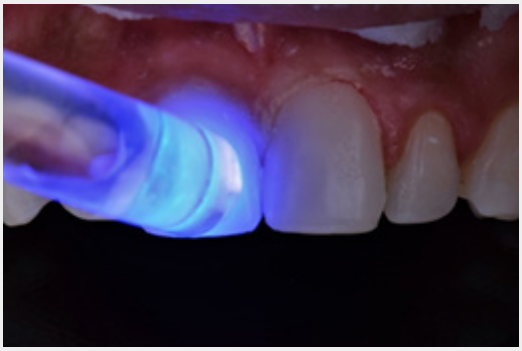

Figure 18: Lightcuring with LED.

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Figure 19: After curing, overhang material was removed with a scalped blade.

Figure 20: Finishing the incisal edge using abrasive discs.

Figure 21: Finishing the cervical area of the restorations using a fine diamond bur.

Figure 22: Lightcuring with LED of the lateral incisors, following the same protocol.

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Figure 23: Finishing the cervical area of the canines.

Figure 24: Final view of the clinical case: 6 prefabricated composite veneers.

Figure 25: Smile appearance of the finalized clinical case.

Figure 26: Lingual/incisal view of the prefabricated veneers.

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Figure 27: One-year follow-up. The view of the restorations at one-year recall.

When comparing the results with previous studies, prefabricated composite veneers emerge as a viable and efficient option for aesthetic smile rehabilitation [10]. These veneers offer considerable advantages, such as: dental structure preservation, technical simplicity, and reduced cost [11]. Although other material options, such as ceramics, are available, prefabricated composite veneers stand out as an interesting alternative, especially in cases requiring multiple-tooth restorations, simplifying the clinical procedure, besides dental preservation compared to indirect procedures [14]. However, it is essential to highlight the limitations of this study. The clinical case follow-up was conducted for a one-year period so far, which, although providing significant information, may not offer a long-term evaluation of the results. Additionally, considering the individual peculiarities of each patient, the professional's experience when selecting appropriate techniques and materials is crucial. The prefabricated composite veneers revealed a low level of discoloration tendency after different wear tests [15]. Karveli et al. [16] have tested prefabricated composite veneers and indirect composite resins regarding abrasion under a toothbrush simulator. Prefabricated veneers showed less change in surface gloss, but a rougher surface though. In summary, this case report reinforces the effectiveness of prefabricated composite veneers as an alternative technique for aesthetic smile rehabilitation. These veneers demonstrate satisfactory aesthetic outcomes while preserving dental structure and providing a less invasive treatment option. Nonetheless, further research involving a larger number of cases and long-term follow-up is necessary to provide a more comprehensive and in-depth understanding of this restorative technique.

Conclusion

Therefore, it can be concluded that the technique of aesthetic smile rehabilitation using prefabricated composite veneers is a viable alternative in certain well-indicated cases. Its low cost and simplified technical procedure stand as the primary reasons for its choice. However, professionals should be knowledgeable about the limitations of the technique, such as: adaptation difficulties and operator skills. A careful clinical protocol must be adopted, ensuring increasingly predictable results and achieving complete patient satisfaction. Even though the one-year follow-up revealed a good performance overtime, further long-term studies are imperative to evaluate the longevity of these restorations.

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