

Case Report

Prefabricated direct composite veneer: with and without teeth preparation

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Abstract

Background: Compoener (prefabricated direct composite veneer) is a nano-hybrid composite enamel veneer that combines the advantages of both, placing a direct composite resin and those of a prefabricated laminate veneer manufactured in a laboratory. Any structural defects or anomalies in the anterior teeth or 'esthetic zone' create a problem for the patient. Hence, composite laminate veneers focus on targeting such abnormalities where the dentist is in complete control of the outcome, despite the pre-existing color, shape, structure, contours or morphology of the tooth. The aim of the study was to determine the success rate of using prefabricated direct composite veneers for cases with minimal preparation and 'prep-less' technique and compare both outcomes for establishing a better and long-lasting restoration.

Case presentation: The study presented two case reports, the first case was of a 46-year-old female with major complaints regarding spaces between upper teeth along with yellow discoloration. While the second i.e. Case 2 was of a 23 years old female with generalized spacing in her teeth due to microdontia and her chief complaint was the diastema present in between her upper front teeth.

Management and Results: A minimal preparation technique for composite veneering was used in Case 1 to combat the problem of yellow discoloration along with generalized spacing whereas a 'prep-less' technique was used for Case 2. Both cases depict different methods of composite veneering and restorations for both minimally prepared or 'prep-less' technique showed no differences at the follow-up visit (after 6-month).

Conclusion: Composite veneers have shown excellent results for restoring anterior defects while preserving tooth structure and surrounding tissues. It has proven to be the most time-efficient way of restorations meeting the high demands of superior esthetics and cost-effectiveness.

Keywords

Composite, Veneer, Esthetics, Discoloration, Diastema.



Introduction

Esthetic dentistry has become popular among people of all ages and deals with maintenance and enhancement of one's smile¹, while also playing a major role in the correction of facial profiles and jaw discrepancies². The advancements in Esthetic dentistry have led people to be more enthusiastic about figuring out how dental work can help in improving their personalities. It strives to achieve a union between function and beauty according to the needs of the individual.

Ceramic restorations have shown excellent outcomes when it comes to dealing with restoring anterior teeth³. Its remarkable biocompatibility, chemical stability and the ability to imitate the structure and translucency of the natural tooth have made it the material of choice for anterior teeth⁴. Although there are various choices when it comes to achieving an attractive and natural smile, composite veneers have shown the highest success rates, while preserving surrounding tissues and opening new doors towards conservative restorative treatment⁵.

Esthetic dentistry focuses primarily on the anterior region of the mouth and any imperfections in this area are of major concerns to the patient. By using composites, the patient gets a combined advantage of both a direct resin restoration along with a pre-made laminate veneer which is available in different sizes and can be easily customized according to the variations of tooth size discrepancies⁶. Prefabricated direct composite veneers have shown promising results despite the severity of the situation and work well in cases of devitalized teeth, marginal discolorations of restorations, dental fluorosis and restoring teeth subjected to bruxism^{7&8}.

There are two types of composite veneering: direct and indirect veneering techniques. Direct composite veneers are the most commonly used, which involves the application of direct veneers on minimally prepared tooth surfaces using composite resin⁹. This can be achieved in a single appointment at the dental clinic and the dentist can easily manipulate the shade, size and shape of the restoration¹⁰. Although it has many benefits, its success solely depends upon the skill of the dentist and since it is highly technique sensitive, this can sometimes cause failure of restoration¹⁰.

Unlike direct veneers, which are prone to wear and have low resistance to attrition or fractures, indirect composite laminate veneers have an advantage of having better strength in such cases¹¹. Although they have higher wear resistance, the added chair side time along with increased cost of treatment and use of cement pose as potential disadvantages when compared to direct composite veneers¹².

Case Presentation

CASE I

A 46-year-old, female patient presented to the dental Out Patient Department (OPD) with a complaint of having a space between her upper front teeth with generalized yellowish discoloration, after which she was referred to the Operative Department of the hospital.

A detailed history and examination were done after taking consent from the patients. Which revealed that she had no significant medical history, nor the presence of any systemic disease or infections. Her dental history revealed that she had a missing upper right second molar and lower left second molar, which she got extracted due to pain 2 years back. A partial denture was given to her by her previous dentist to replace the missing teeth. She also stated that a filling was done twice by

her previous dentist to close the diastema between upper anterior teeth but the filling got dislodged within two months.

On clinical examination, a prominent midline diastema (less than 2 mm) was recorded, along

with yellow discoloration of teeth. Satisfactory oral hygiene was noted. Upper right and lower left second molars were missing. No soft or hard tissue pathology was identified and the temporomandibular joint (TMJ) revealed no signs or symptoms of any pathology.



Figure I(a): Pre-operative Intraoral photograph



Figure I(b): Full mouth impressions were taken for record keeping



Figure I(c): Before finishing



Figure I(d): After finishing and contouring

Figure I(a-d): Pre-operative intraoral photographs were taken for records and a treatment plan was devised

CASE 2

A 23-year-old female patient came to the dental OPD with a complaint of having small teeth and generalized spacing for which she was referred to the Operative Department. A thorough history and examination revealed that the patient had microdontia which was a trademark feature of all females in her maternal family. There was generalized spacing in all her teeth but her major concern was the diastema present in her upper anterior teeth. She had no significant medical history of systemic diseases or infections. Her dental history revealed that she had all permanent teeth present except for third molars which were absent. A small bony

defect was noticed in the lower right quadrant just distal to her second premolar, to which she stated that she got a deciduous tooth extracted when young and that bony defect was present since then.

On clinical examination, a midline diastema (more than 2mm) was noticed. Oral hygiene was moderately maintained. There was occlusal caries present in the first permanent lower molars and minimal deposits of calculus were seen. No evident presence of plaque was noticed. The patient presented with a deep bite. No soft or hard tissue pathology was identified and TMJ revealed no signs or symptoms of any pathology.



Figure 2(a): Intraoral photograph



Figure 2(b): Before finishing



Figure 2(c): After finishing and contouring

Figure 2(a-c): Intraoral photographs were taken and a treatment plan was devised

Initially, the patient was advised orthodontic correction of the defect because there was generalized spacing and later restorations were advised to correct the size discrepancy. Orthodontic treatment was emphasized for the correction of the deep bite as well. However, due to extensive treatment time, the patient refused orthodontic treatment and other restorative measures were analyzed.

Management & Results

Various treatment options were used for both patients which included orthodontic treatment, porcelain fused to metal crowns, zirconia crowns, lithium di-silicate crowns, porcelain veneers, indirect and direct composite veneering. However, since the patients were not able to afford expensive treatment and were not willing to come in for multiple visits over a period of time, the option of direct prefabricated composite veneering was selected. Due to various constraints, extensive orthodontics and expensive porcelain crown or veneer treatment options were ruled out. Hence, prefabricated transparent direct composite veneers were chosen to be used for the treatment.

The sequence of management and treatment was initiated by dental prophylaxis and polishing, which was followed by preparations for diagnostic models. Full mouth impressions

were taken to evaluate tooth proportions (Case 1 shown in Figure 1b). Since there was adequate labial enamel surface present, no root canal procedures were performed.

Further, Glass Ionomer Cement (GIC) buildups were done on both first permanent lower molars for Case 2. The buildups were kept bulky by adding 2 mm of extra GIC on the occlusal surfaces to open the bite. This was a necessary step taken to ensure that the natural bite does not result in any trauma to the components since the patient had a deep bite. No such step was taken for Case 1.

A slurry of pumice in water was used to clean the tooth which was then left for drying and a shade was selected. The shade selection was done in daylight, where a series of test shades were applied to the tooth surface and cured. No etchant or bonding agents were applied prior to this process and were solely done to determine the correct shade for the restoration.

Shades A1, A2 and A3, according to the VITA shade guide, were applied simultaneously and checked for the best shade. Shade A2 was mutually selected by both the dentist and the patient for Case 1 and Case 2.

Different sizes of the transparent prefabricated direct veneers were placed on the diagnostic models to check for size and contour for Case 1. The sizes were compared and the medium size was selected with the consent of the patient. Veneer preparation was done on the study model and a mock-up using composite resin was done in order to show the end result of the restoration to the patient. Once the patient was satisfied with the size, shape and overall appearance of the restoration, veneer preparation was initiated.

Preparation and contouring of upper right and left central incisors, lateral incisors and canines were done using a chamfer bur to reduce labial enamel by 0.3 – 0.5mm to achieve adequate tooth reduction for placement of composite resin material. The preparation was done keeping in mind the adequate contour, proportions, embrasures and emergence profile of each tooth. The gingival finish lines, along with mesial and distal margins just labial to the contact points were also noted.

Similarly, prefabricated sizes for veneers were checked to determine the particular size for the restoration for Case 2. Since the patient had pre-existing microdontia, the medium size of veneers was decided on by the dentist to compensate for the small size of the teeth and trimming the veneer with composite finishing disc was done for adjustments. Teeth were not

prepared for this case as no reduction of enamel was required.

The teeth were etched using 37% phosphoric acid for 20 seconds each, after which they were washed and dried. Mylar strips were fixed using wedges and a very thin layer of bonding agent was applied in a cervical to the incisal motion. Each tooth was then cured for 10 seconds.

Each componeer is individually packaged and was removed using tweezers. The etchant was applied, washed and then dried, after which a thin layer of bonding agent is applied to the inner surface of the componeer but it is not cured. Subsequently, a thin layer of the A2 shade of composite resin is applied on the cervical third of the tooth and also on the componeer. The componeer is then carefully placed on the tooth surface with the help of a placement tool to ensure adequate force is being applied. Once the componeer has been placed and adjusted, the excess composite resin is removed using a bladed instrument and the tooth is cured for 30 seconds.

Once all the componeers are placed, the Mylar strips are removed and the cervical margin of the teeth is defined using a fine diamond tapered bur. Interproximal strips were used to finish the restoration proximally, whereas graded sandpaper discs were used for the labial surfaces to establish a continuous and smooth surface ensuring there were no voids present in the composite. Once finishing and polishing were completed a series of intraoral photographs were taken so a comparison could be made from the original state of teeth.



Figure 3 (a & b): Comparison of the patient's intraoral photographs before and after treatment for Case I.



Figure 4 (a & b): Before and after treatment with Compoeners for Case 2.

A comparison of before and after treatment with prefabricated direct composite veneers for both cases are shown in figures 3 & 4. The patients were then instructed on oral hygiene instructions along with post-op precautionary measures. A follow-up visit was planned after six months. No discolorations or damages to the restoration were noted on the recall visits (Figure 5 a & b).



Figure 5 (a & b): 6-months follow up picture for Case I & 2

Discussion

In recent years, people have shown a rapid change in lifestyles and have become more conscious of their outer appearance and are constantly judged based on their physical characteristics. Due to increased social pressures and globalization all over the world, the outer appearance of a person is prioritized, in both professional and personal lives. This has led to an influx of people visiting the dentists for esthetic concerns.

Porcelain veneers have been extensively used for esthetic restorations but due to its

destructive approach and expensive nature, other more conservative techniques have been developed¹³. Ceramic veneers still provide better color stability and a very high resistance to abrasion or fractures when compared to other modes of treatment but have the biggest disadvantage of increased cost and longer chair time¹⁴. The slightest miscommunication between the dentist and the technician can also lead to failure of restoration since any deviation from the required shade can cause lack of scaffolding the discoloration. Any minor adjustments to the restoration require tedious laboratory work and cannot be done as a chairside

procedure. The adhesion of the ceramic to composite cement still remains low and constitutes the reason for most failures¹⁵.

Recently, another dental material that has gained popularity is Zirconia. It is an oxide-based, non-living substrate that has high strength, high resistance to cracks and the ability to mask underlying discolorations due to its opaque nature¹⁶. Its biocompatible nature adds to its many attributes along with being a metal-free alternative for long-lasting esthetic restoration¹⁷. However, zirconia possesses some properties that have an adverse effect on the remaining teeth. It is robust in nature and often leads to abrasion of the opposing dentition, also causing decay underneath the restoration¹⁷. Since the material itself is almost indestructible, the severity of the underlying decay often is only noticed by the patients as pain which ultimately results in the crown falling off¹⁸.

The most favorable method of solving esthetic problems is using composite veneering techniques. Since composite resins are available in various shades and opacities they are able to easily replicate the natural appearance of the underlying dentin and enamel¹⁹. Direct composite veneering technique is freehanded and does not require any additional laboratory work, resulting in an easier to manage approach for both the patient and the dentist. As validated by several clinical reports, direct composite veneers have a higher success rate when it comes to dealing with large anterior defects²⁰. Unlike porcelain or zirconia veneers, composite veneers can be repaired intra-orally and the finishing and polishing procedures are relatively easier²¹. Prefabricated composite veneers also provide the extra advantage of being non-

abrasive to the opposing dentition, a major disadvantage of ceramic restorations²².

To establish both functional and esthetic coherence, direct composite veneers were selected as a choice of treatment for both cases. In case 1, the patient was unsatisfied with the yellow discoloration and gap between her upper central incisors and considering the financial restrictions of the patient direct composite veneering technique was given priority than the indirect veneering technique (Figure 1a). Factors such as wear resistance, strength and conservation of tooth structure were major factors in selecting this technique. Ceramic veneer options were ruled out due to their high cost and added chair time. A minimally prepped tooth surface was restored using direct veneers resulting in high patient satisfaction even at a 6-month follow up. All restorations were in place with no stains, discoloration or cracks seen (Figure 5a).

In case 2, the patient had generalized spacing owing to microdontia and was highly conscious of her smile. She refused orthodontic correction of the anomaly and ruled out all ceramic restorative options since they were highly priced. Given the advantages of a single visit correction of her complaint, direct composite veneering was chosen as the mode of treatment. No veneer preparation was done in this case and a 6-month follow up showed no cracks or wearing off in the restorations (Figure 5b). When compared, both cases showed high patient satisfaction and successful end results of using direct composite veneers at a 6-month follow up (Figure 5a & b). No significant changes or problems were faced by either patient owing to differences in initial tooth preparation. The clinical

method used in this paper is suitable for cases with discolorations, broken down teeth, faulty restorations, cases dealing with bruxism and malposition teeth²³. It maintains a high ground as being highly conservative of tooth structure along with being financially suitable for majorities.

However, there are certain limitations to this study. Since only two cases were depicted in this study, a better evaluation regarding the success rate of prefabricated direct composite veneers can be done with more cases. A follow-up time of more than 6 months can also help to establish the longevity of this mode of treatment and counteract any problems which may occur when using prefabricated direct composite veneers.

Conclusion

The concept of a 'one-visit' restoration using prefabricated composite veneers has characteristically proven to be sufficient in restoring a stable and esthetically pleasing smile along with being effortless for the patient. Although being technique sensitive, this procedure got a positive feedback from dentists all over owing to reduced chair time and the added expenses of laboratory work.

Conflicts of Interest

None.

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