

A Simple and Predictable Direct Technique for Esthetic Provisional Veneers

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ABSTRACT

There are a number of different techniques for fabricating provisional veneers. There are direct and indirect techniques involving acrylic or composite resin veneers made with or without a vacuform matrix. This article describes a direct technique for fabricating removable provisional veneers using an auto-polymerizing urethane dimethacrylate resin and a thermoplastic matrix that may later serve as a stent to be worn with the provisional veneers.



The fabrication of provisional veneers has generally been regarded as a difficult and time-consuming with many disadvantages.¹⁻⁴

While there has been a trend in restorative dentistry toward fabricating provisional restorations to provide a blueprint for the definitive restoration,^{5,6} this has not been the case with veneers since many clinicians prefer not to provide their patients with provisional veneer restorations.^{4,5,7,8,9} Problems associated with utilizing provisional veneers have included: the frequent inconvenience of patients returning with fractured or de-bonded provisionals since the restorations are thin; the increased incidence of gingival inflammation which may complicate the seating of definitive restorations; and the additional time and lab expense involved. Meanwhile, veneer preparations are often within enamel or extend minimally into dentin, often do not involve broken interproximal contacts, often have supragingival margins, and rarely affect the occlusion.

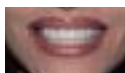
However, the fabrication of provisional veneers has been found to be a valuable and frequently necessary step in the treatment of patients with porcelain laminate veneers from an esthetic and comfort standpoint. Although many of the preparations do lie within the enamel layer, patients are often displeased

with the appearance of their prepared teeth and the associated initial increase in tooth sensitivity. Provisional veneers are valuable in maintaining patients' physical and social comfort.⁷ Furthermore, when carefully made to resemble the definitive restorations planned, provisional veneers permit the patient and dentist to preview the esthetic changes planned, and provide diagnostic information about how the changes in the length, width and/or shape of the teeth may affect esthetics, phonetics and occlusion.^{1,3,7,9,10} This way, the patient may better understand the how their desires to lengthen their incisal edges may be limited by their occlusion and vertical dimension and why it may be necessary to restore their posterior teeth. Once the patient approves the esthetics, the provisional veneers may also communicate the esthetic goals to the ceramist. Establishing the correct length before fabricating the definitive restorations is essential to an optimum result. It is only when the ceramist knows the correct length of the veneer that the porcelain may be properly layered to create incisal effects in the defini-



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Figures 1 and 2. Pre-treatment views of a patient who desired esthetic changes to her maxillary anterior teeth. The patient felt her existing veneers looked short, wide and dark. They had been placed 10 years earlier to mask interdental spaces. The veneers required replacement due to interproximal marginal decay and leakage.



Figures 3 and 4. The patient's pre-treatment smile. Her smile does not appear very full because her teeth do not fill her smile. The patient felt her teeth appeared short, wide and dark. A dental facial evaluation was completed and shows the incisal edges of the central incisors are shorter than the mid-point between the upper and lower lips when she smiled and the canines and maxillary left posterior teeth hang down longer than her central incisors. Her occlusal plane is not flat and the incisal edges of the teeth do not parallel the curvature of her lower lip.

tive veneers, such as halos and translucent areas.^{10,11} Provisional veneers may also prevent the eruption of mandibular teeth when there is incisal reduction or minor shifting in the alignment of teeth, when tooth contacts are broken.⁷

There are a number of different techniques for fabricating provisional veneers. There are direct and indirect techniques involving acrylic or composite resin veneers made with or without a vacuform matrix. This article describes a direct technique for fabricating removable provisional veneers using an auto-polymerizing urethane dimethacrylate resin and a thermoplastic matrix that may later serve as a stent to be worn with the provisional veneers. The conception of the technique follows the use of the Essix appli-

ance in implant dentistry for the replacement of missing teeth.^{12,13}

Case

A patient presented with six maxillary anterior veneers that were placed 10 years earlier to mask the interdental spaces present between her teeth. Interproximal decay was present and the patient wanted the veneers replaced with veneers that were longer and whiter (Figures 1 and 2). She wanted to bleach her lower teeth, but knew she could not unless she changed her maxillary veneers. She also felt her teeth looked short and wide and wanted a fuller smile. A facial esthetic evaluation, including an assessment of her incisal edge position, was completed. (Refer to Dr. Tal Morr's paper, "Understanding

the Aesthetic Evaluation for Success.") The incisal edges of the existing veneers fell short of the midpoint between the upper and lower lips when the patient smiled or said "eeee" (Figure 3 and 4), confirming that her maxillary anteriors were too short. A diagnostic mock up was completed by first curing composite resin onto the incisal edges of the two central incisors without etching or adhesive. Next the canines were lengthened and then the lateral incisors (Figures 5 through 7). The purpose of the mock up was to give the patient an idea of how her smile may be improved by lengthening her teeth and to help her determine how many teeth she wanted to have treated. From the mock up, the patient saw the possible improvements to her smile and realized a better result with a more gradual transition of her occlusal plane could be obtained by involving her right and left premolars.

An idea of how much to lengthen the teeth may also be obtained. However, the desired length is fine-tuned later with the wax up and provisional restorations when adjustments for occlusion, phonetics, esthetics and function may be made.

In this case, it was determined that the central incisors should be lengthened approximately 1.5 mm, not quite as long as the mock up. For this patient, the overall treatment plan involved bleaching the lower anteriors, placing a single tooth implant to replace the cantilever bridge that currently replaced the missing maxillary right first premolar and replacing the maxillary six veneers with new veneers that extended to the maxillary left second premolar. For improved esthetics, the new veneers were to be 1.5 mm longer at the central incisors with the canines matching in length. The resulting occlusal plane was to be flat and level with the patient's inter-pupillary line so that the incisal edges of the maxillary anteriors paralleled the curvature of the lower lip. The treatment plan was accepted.



Figures 5 through 7. A composite mock up was completed to determine how much the maxillary anterior teeth should be lengthened. **Figure 5** shows the patient's pre-treatment smile. First, the length of the two central incisors was assessed. **Figure 6** shows composite resin added to the central incisors until the incisal edge position fell below the midpoint between the upper and lower lips when the patient said "eeee." Once the length of the two central incisors was established, the canines were lengthened so they were level with the central incisors. Then the laterals were lengthened so that they were slightly shorter than a line connecting the central incisors and canines. **Figure 7** shows the patient's smile with the completed mock up on her six maxillary anterior teeth. After viewing the mock up, the desired length of the new veneers was confirmed. The patient also decided to have the first and second premolars treated.



Figure 8. The matrix utilized as a preparation guide to gauge the amount of reduction needed or completed. These are the patient's teeth immediately upon removal of her previous veneers, prior to any preparation. The preparations extended into dentin and the preparations wrapped interproximally to give the technician more flexibility in the contour to close the interdental spaces the patient had had.



Figure 9. The matrix and provisional veneer immediately upon removal from the patient's teeth, showing the flash present.



Figure 10. A completed provisional veneer.

Method

Preliminary study casts are made of the patient's existing dentition. When a diagnostic composite mock up has not already been done clinically to determine the length, width, contour and occlusal plane, a diagnostic wax up may be completed. A thermoplastic shell matrix (.040 mm clear matrix material, Raintree Essix, Metairie, LA) is made on a cast of the provisional wax up or mock up. The matrix is trimmed with a straight edge, 1 to 2 mm from the gingival margins. During tooth preparation, the matrix may be used as a preparation guide to evaluate the amount of reduction. **Figure 8** is a photo of the preparation guide on the patient's teeth immediately upon removal of the patient's previous veneers. The patient's preparations from her previous veneers extended into dentin and the preparations wrapped interproximally to give the technician greater flexibili-



Figure 11. Diamond disks (Brassler, Savannah Ga.) and 1/4-inch Moore sand paper disks are used to shape the provisional veneers, open up embrasures and refine the gingival margins.



Figure 12. The palatal view of patient's provisional veneer restoration showing the interdigital tags of resin. With the teeth splinted around the arch, the proximal surfaces of the teeth and the interdigital tags help to retain the provisional restoration.



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Figures 13 through 15. The completed provisional veneers are esthetic and patients are happy to have teeth that look pleasing. The provisional veneers provide an immediate esthetic improvement over her previous veneers. They are longer, better proportioned and follow the curvature of her lower lip. These photos were sent to the laboratory to communicate the desired esthetics.

ty in the contour, to close the interdental spaces that she had had. (Refer to Dr. John Kois' paper "Diagnostically Generated Anterior Tooth Preparation for Adhesively Retained Porcelain Restorations: Rationale and Technique.")

Upon completion of the tooth preparations and final impression, the matrix is utilized to fabricate the provisional veneers. Luxatemp Automix Plus (Zenith DMG, Englewood, NJ), a hybrid, auto-polymerizing dimethacrylate resin, in the correct shade, is dispensed via a cartridge-mixing tip and injected into the incisal edges of the matrix. Care is exercised to avoid the formation of air bubbles. A small amount is also injected onto the patient's bib to yield a sample drop which may be used to monitor the setting reaction of the resin. The loaded matrix is then seated firmly over the teeth and held in place until the resin has started to set. The matrix, along with the resin veneers, is then removed (Figure 9). If there are many undercuts present or interdental spaces, such as when the contacts have been broken, the resin veneers may remain on the teeth when the matrix is removed. The provisional restoration may be gently teased off with a plastic instrument to avoid fracturing it, but one must be careful to do so quickly before the resin has set completely to avoid locking in the restoration. Some of the interdental tags of resin may fracture off, but usually enough remain enabling the resin veneer

to be placed back onto the teeth securely. One should attempt to maintain the provisional restoration in one piece when multiple teeth are involved because the additional units may enhance the retention of the provisional restoration on the teeth (Figures 9 and 10). The resin veneer is permitted to set completely before the excess resin is trimmed.

The flash is usually very minimal on the facial surface and slightly greater on the palatal (Figure 9). It may be broken away quickly by hand. Then the provisional restoration may be trimmed and shaped. The facial margins and excess may be trimmed using a friction grip diamond bur (KS-6, BrasslerUSA, Savannah, GA) or sand paper disks (1/8-inch, E.C. Moore Company, Inc., Dearborn, MI) and lab hand piece. Diamond finishing disks (918B-220 or 911MF-2290, BrasslerUSA, Savannah, GA) may be used to further refine the facial and incisal embrasure spaces (Figures 10 and 11). One should attempt to maintain the provisional restoration in one piece when multiple teeth are involved because the additional units may enhance the retention of the provisional restoration (Figure 11 and 12). There should be minimal trimming of the palatal surfaces and the interdental tags which will help retain the restoration (Figure 12). The trimmed veneers are placed onto the patient's teeth to evaluate fit, esthetics, phonetics, function and occlusion in centric relation, lateral and protrusive excursions (Figure 13

through 15) and the necessary corrections made. Sometimes small adjustments may need to be made to the incisal edges or length. Small porosities may be filled in with composite resin. Characterization of the veneers, if desired, may be achieved by cutting out small areas from the facial surfaces and laying in different shades of composite resin. This is generally not necessary, however. The completed provisional veneers may be polished on a lathe with pumice and high shine. A beautiful set of provisional veneers may be completed in as little time as 15 minutes. These provisional veneers are not cemented or bonded to the teeth and remain removable.

When the finished provisional veneers are evaluated and the patient and dentist pleased with the appearance, an irreversible hydrocolloid impression is made to obtain a study cast of the provisional restorations. The cast and photographs of the patient's face, smile and teeth with the restorations, are sent to the laboratory with the final impressions and provide the technician with a guide when making the definitive veneers (Figures 13 through 15). The casts of the provisional restorations are cross-mounted with the master cast so that the provisional restorations may serve as a blueprint for the definitive veneers. At times, the provisional restorations, provided they are of adequate thickness and proper contour, may be a saving grace when the technician says



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Figures 16 through 19. Photos of a second patient who had his maxillary incisors prepared for veneers. He chose to wear his provisional veneers with the stent. The photos show him wearing the provisional restorations with and without the stent. Figure 16 shows healthy gingival tissues despite having worn the provisional veneers for eight weeks. His provisional veneers look a little yellow because he did not decide to whiten his teeth until after the veneers were prepared. His treatment was delayed so that shade selection could occur after his bleaching was completed.



Figure 16.



Figure 17.

the desired esthetics are unachievable.

The patient is instructed upon the insertion and removal of the provisional veneers and the process rehearsed a number of times under supervision. He or she is informed that the provisional veneers are for esthetics only, that they are thin and susceptible to fracture, and eating and sleeping with them is discouraged. The author has found, however, that patients do tend to eat with them on and have done so successfully. With other techniques, matrices are normally discarded at this point. However, with this technique, patients are instructed that the matrix may be worn as a protective stent. The provisional veneers may be inserted into the matrix and the two worn together to provide the provisional veneers an extra level of protection and stability, particularly if the patient insists on eating with them. **Figures 16 through 19** are of another patient who had his four maxillary incisors prepared for veneers. The photos show him wearing the provisional veneers with and without the stent. From clinical use, this brand of thermoplastic material seems to be more flexible and resistant to wear and breakage. The provisional veneers may be secured in the matrix with cyanoacrylate glue. Most patients find the provisional veneers have adequate stability and retention to be worn without the stent and many patients have preferred to do so to obtain the maximum level of esthetics. This is particularly true where multiple units are involved. A single veneer is more likely to be worn with the matrix.



Figure 18.



Figure 19.

Regardless, patients are happy to have the assurance of knowing they have the matrix as a back up in case the additional stability is necessary. Once the matrix has been wet with saliva, its appearance is not as obvious. The matrix may also be used again to replace a lost or fractured provisional veneer.

The patient is instructed to remove the provisional veneers and brush and floss normally, as regularly as possible to maintain the health of the teeth and gingival tissues. The provisional veneer and stent may be maintained by soaking in denture cleaner and brushing. At the delivery appointment, the clinician may find the health of the gingival tissues to be optimal because the oral hygiene procedures are unobstructed and there are no rough, overhanging or unsealed margins to maintain (**Figures 16 and 20**). In **Figure 16**, the gingival tissues appear healthy despite wearing the provisional veneers for eight weeks. In **Figure 20**, the patient wore the provisional veneers for 12 weeks. Additionally, there are no

bonded restorations to pry off and no adhesive on the enamel or dentin surface to be concerned about.

Discussion

This technique has many advantages. It is quick and simple, involves very little advance preparation, minimal material expense, and results in a provisional restoration with excellent esthetics from which the patient may preview the planned restoration and esthetics. An effective provisional restoration can be the key to preventing unwanted surprises and esthetic failures and facilitates the fabrication of the definitive veneers. The incisal edge position, length, width and shape of the definitive restorations in **Figures 21 and 22**, mimic that of the provisional veneers in **Figures 14 and 15** and were communicated to the ceramist.

Many authors^{1,5,7,9,14} have recommended either cementing or bonding the provisional veneers or curing the direct provisional veneer onto the tooth surface (with or without etching and adhesives)



Figure 20. This photo shows the health of the gingival tissues and preparations of the first patient, after wearing the provisional veneers for 12 weeks. Note that the preparations are not conservative because the patient's previous preparations were not conservative and decay had been present under her previous veneers.



Figures 21 and 22. Photo of the teeth positioned end to end showing the patient's new definitive veneers which match her bleached lower teeth. The length, width, shape and alignment of the new veneers mimic the esthetics previously worked out with the patient in the provisional restoration.



Figure 23. With her new veneers, the patient's smile appears more radiant. Her maxillary teeth are longer and now appear to fill her smile.

and then trimming and finishing the provisional restoration without removing it from the tooth. The removable provisional veneer has the following advantages: Since finishing of the veneer may occur outside of the mouth, there is no risk of damaging the preparation finish lines or injuring the gingival tissues. The provisional veneers may also be shaped and polished ideally. This provisional veneer is not bonded to the tooth, so there is no risk that the fitting or bonding of the definitive veneers may be affected. The health of the gingival tissues may be optimized because the patient's oral hygiene efforts are unobstructed.

The material utilized is an auto-polymerizing bis-acryl resin. This material has the advantage of being more translucent, color stable and resistant to staining than methyl methacrylate resin. It

has excellent polishability and is compatible with light-cured composites so that the latter may be used for repairs or characterization. The material is self-curing and sets gradually with little dimensional shrinkage and little exothermic reaction, so it may be allowed to cure directly on the tooth surface to yield a tight fit, with little fear of "locking on" the provisional. Although composite resin is the material of choice for a number of authors,^{1,5,9} this technique, is not compatible with light cured composite resins because the interdental resin, once light cured, would cause the restoration to be "lock on" the teeth.

Conclusions

This method of fabricating provisional veneers is simple, quick and reasonably inexpensive. It provides an esthetic restoration that may make the patient more happy, secure and comfortable and provide the patient, dentist and ceramist an effective way of evaluating and communicating the esthetic goals. The advantages of this method of fabricating provisional veneers outweigh the disadvantages.

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