

# Revisiting the Design of Minimal and No-Preparation Veneers: A Step-by-Step Technique

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**ABSTRACT** The concept of minimal preparation is more than 25 years old. Interest in conservative treatments is being revisited as dentistry embraces thinner ceramic veneers and adhesive bonding agents that keep preparations in enamel. Experience and professional knowledge help determine appropriate treatments based on patients' clinical situations and esthetic demands. This article reviews the veneer modality, its role as a conservative treatment, and the protocol to be implemented to ensure proper treatment planning and material selection.

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Dentists and their patients today are increasingly exposed to marketing messages about no-preparation, thin, and minimal-preparation veneers. Some of this information may only be hype that is designed to entice patients into obtaining treatment or to motivate dentists to incorporate a new restorative material into their armamentarium. Regardless, the age of interest in conservative treatments and minimal intervention is being revisited and the public is demanding the preservation of their natural tooth structure.<sup>1</sup>

The concept of no preparation or minimal preparation is more than 25 years old.<sup>1</sup> Veneers were first introduced as an additive technique and designed as a conservative method of restoring teeth, providing an option other than full-coverage crowns.

In the early 1980s, Calamia introduced

the innovative concept of bonding thin pieces of porcelain to teeth.<sup>2</sup> Treatments with this modality initially were done with no or little preparation, and with the veneers placed on the facial surface of the tooth.<sup>3</sup>

These original veneers were approximately 0.5 mm in thickness, tapering down to practically nothing at the margins. The newer, thin veneers available today claim thicknesses of less than 0.5 mm and can be fabricated down to a minimum thickness of 0.3 mm.<sup>1</sup>

Calamia and his colleagues later observed that with veneers placed without any preparation, the veneers were too thick and periodontal problems occurred as a result of the overcontoured teeth (i.e., change in emergence profile).<sup>4</sup> As a result, patients were notified of the need for diligent home care in order to preserve the health of gingival tissues.

However, after concluding that the veneer modality would function long term, Calamia and his team determined that, from a periodontal perspective, it made sense to use a preparation that would provide sufficient space for the laminate veneer.<sup>1</sup> The slight preparation developed was a 0.5 mm reduction. The 0.5 mm was restored in the porcelain thereby providing the original thickness of the tooth with the new veneer. Additionally, researchers later determined that wrapping over the incisal edge enhanced the strength, and that only preparing the facial surface of the tooth was not as strong as wrapping over the incisal onto the linguals.<sup>5</sup>

### The Influence of Materials on Preparation Design

Concurrent with the development of the veneer technique was the introduction of new materials for their fabrication. Among the first used was stacked feldspathic porcelain. Other types of porcelains (i.e., pressable ceramics) emerged, leading to challenges in terms of the technicians' abilities to create very thin restorations.<sup>1</sup> As a result, the minimum reduction initially required for some pressed ceramics approached 0.75 mm to 1.5 mm, which was more aggressive than the .5 mm reduction necessary for the original feldspathic veneers.<sup>6</sup>

This fit well with how the laboratories operated. Dental technicians were accustomed to waxing, which made the pressed restorations a good option. However, ceramists demanded more thickness to build in all of the nuances of tooth structure and color into these thin restorations.

In that regard, dentistry seemed to have shifted from the preservative ideology of the 1970s. Many clinicians believed it was easier to reduce sound tooth structure for veneers rather than devise a treatment plan in collaboration with specialists that would be less invasive to the



**FIGURE 1.** Preorthodontic view showing the patient biting.



**FIGURE 2.** Preorthodontic view of the separated teeth showing mandibular anterior crowding and lingual tipping of the posterior teeth.



**FIGURE 3.** Pleasing smile showing asymmetry of the central incisors both gingivally and incisally, lateral incisors that are to the facial, and apical gingival levels at tooth No. 10.



**FIGURE 4.** View of the patient biting.

enamel. In the esthetic zone, the relationship with porcelains and even the newer ceramics (i.e., zirconia) required as much or more removal of the tooth structure.<sup>7,8</sup>

This had unfortunate consequences as enamel substrates are of key importance and, when properly prepared, provide the most predictable surface on which to bond. Regardless of the lingual preparation design, porcelain veneers that stay on enamel demonstrate the highest degree of long-term success.<sup>1,9,10</sup>

### Step-by-Step Considerations for Minimally Invasive Veneers

It's now time to come to terms with the need to be minimally invasive with approaches to cosmetic dentistry and restorative treatments and incorporate interdisciplinary collaboration into the planning process.<sup>8</sup> Fortunately, dentistry has come full circle and now embraces contemporary restorative materials — such as thinner ceramic veneers and adhesive bonding agents — that do not require the removal of excess tooth structure, as observed with conventional, nonadhesive crown and bridge restorations.<sup>9,11</sup> Dentists need not undertake aggressive preparation designs, but rather

can keep their preparations in enamel.<sup>9</sup>

Ultimately, the experience and professional knowledge of the clinician best determine the appropriate treatment plan based on the patient's clinical situation and esthetic demands.<sup>2</sup> A comprehensive clinical examination and an esthetic evaluation should be performed, dental photographs and centric relation-(CR) mounted study models should be taken, and a number of factors should be addressed during the planning process.<sup>12,13</sup> For example, if a tooth is lengthened, regardless of whether minimal preparations were used, the length may interfere with the envelope of function. Therefore, mounting the models in CR is the author's preference in order to minimize the effects of occlusal trauma, which for most patients will increase the longevity of the restorations.

Occlusal analysis begins with an examination and palpation of the temporomandibular joint, TMJ, and the complete stomatognathic system. Precise study models should be mounted in CR on a semiadjustable articulator (SAM-3, Great Lakes Orthodontics) to allow the clinician to identify any signs of occlusal pathology, such as mobile teeth, worn



**FIGURE 5.** Relaxed lip position shows an appropriate reveal central incisor of 1-3 mm.



**FIGURE 6.** Smile view showing gingival asymmetries between the central and lateral incisors and cuspids. Immediate lateral disclusion appears probable and was confirmed clinically.



**FIGURE 7.** Retracted view, same as smile view.

teeth, abfraction, cracked or chipped teeth, and TMJ-related symptoms.<sup>14</sup>

Dental photographs, including the minimum 12 required for accreditation by the American Academy of Cosmetic Dentistry, facilitate analysis of the macro- and microesthetic principles. Some of the macroesthetic principles include the facial and dental midline, central incisor dominance, tooth shape, arrangement and color, occlusal cant, and occlusal plane, as well as gingival margin levels and buccal corridor deficiencies. Microesthetic principles consist of line angles, axial inclination, gingival margin zenith and heights of contour, maverick colors, secondary and tertiary anatomy, polychromicity, incisal translucency, and incisal halo effects.<sup>15</sup>

Photographs and mounted-study models enable the clinician to visualize the final outcome. With that objective in mind, the preparation design and restorative material selection can be analyzed and determined. The starting point — as there is only one place to start — follows the basic principles of medicine: with an accurate diagnosis. Once there is a diagnosis, the treatment-planning sequence must always begin with esthetics, which has been taught for many years by Spear.<sup>16</sup> Only with a complete understanding of esthetics, function, structure, and biology can it then be considered truly minimally invasive in the treatment approaches.

Other factors to be addressed during the planning process include:

- Midline position and whether or not it needs to be moved, how, and by how much;
- Lip fullness and the manner in which it might be affected by changes in

the facial/lingual position of the teeth/alignment;

- Incisal edge position;
- Occlusion (i.e., stable centric stops, immediate anterior and lateral disclusion, and respect and understanding of the envelope of function);
- Desired color change and whether or not underlying color must be masked;
- Amount of tooth structure remaining, particularly enamel;
- Position in the arch/mouth; and
- Ability to isolate in order to realize ideal adhesive principles.

### Case Description (Case No. 1)

A 16-year-old male high school student, along with his mother and orthodontist, presented for esthetic consultation while he was still in fixed orthodontic appliances. The patient demonstrated a malocclusion and a multitude of esthetic issues, including facial midline discrepancies, dental midline spacing, poor tooth arrangement, poor axial inclination, and gingival asymmetries, among others.

During the initial consultation, achieving an ideal and esthetic outcome through orthodontics — within the parameters of a stable occlusion — was discussed. As the orthodontics progressed (**FIGURES 1 AND 2**), treatment options would be eliminated or added in order to exceed the patient's and his mother's expectations. Several postorthodontic treatment options were discussed with the patient, including no restorative treatment, direct bonding on teeth Nos. 7 to 10 or teeth Nos. 6 to 11; placing veneers on teeth Nos. 7 and 10 while bonding the cuspids and/

or central incisors; or placing veneers on teeth Nos. 7 to 10 or Nos. 6 to 11.

Over the next 15 months, the patient had three re-evaluation appointments (**FIGURES 3 AND 4**). During this time, discussions focused on the esthetic and functional outcomes for this patient. The canines were class 1 and the molars were class 1 relationship on the right and left. The maxillary midline was to the patient's right by more than 1 mm, and a larger space existed on the mesial and distal of tooth No. 7, creating an esthetic quagmire. In the process of making the dental midline coincide with the facial midline, the midline would be moved to the patient's left, thus making the space around tooth No. 7 even larger.

In order to gain immediate excursive disclusion with the lower teeth, the maxillary teeth required retraction, allowing some lessening of the esthetic dilemma and gaining the much-needed functional parameters. Retracting the maxillary teeth also equated to lingually positioning them to enable a “no-prep” veneer design. However, care must be taken not to impinge on the envelope of function when retracting or changing the angulation of the anterior teeth. In this case, the patient had ideal lip support and a good nasal-labial angle, which would not be affected by this minor lingual positioning in order to gain immediate lateral and protrusive disclusion. Intrusion of tooth No. 8 was also needed in order to level the gingival morphology with that of No. 9, creating symmetry of the central incisors (**FIGURES 5 THROUGH 7**).

Following several months of refinement and cooperation between the orthodontist and restorative dentist, it



FIGURE 8.

FIGURES 8 AND 9. Gingival levels show better symmetry, but spaces are still too large around the lateral incisors.



FIGURE 9.



FIGURE 10. Smile view shows macroesthetic issues have been corrected without compromising functional parameters.



FIGURE 11.

FIGURES 11-13. Retracted views show macroesthetic issues have been corrected without compromising functional parameters.



FIGURE 12.



FIGURE 13.

was determined that orthodontics accomplished 90 percent of the esthetic objectives (FIGURES 8 THROUGH 13). The maxillary midline was still slightly off (<1 mm), but in a vertical plane. This has been shown by Kokich to be undetectable by either orthodontists, general dentists, or lay people.<sup>17</sup> The space asymmetry was worked out in a diagnostic mock-up on the models and in the mouth. It was found to be undetectable using some masking techniques.

The natural dentition vary in terms of the reveal, line angles, rotation, and color. Variations in color are especially seen in the lateral incisors, which have a slightly lower value than the central incisors.<sup>18</sup> Therefore, such microesthetic considerations should be part of the treatment plan, with the patient's consent.

#### Treatment Plan

The distal, incisal, facial, and lingual surfaces of tooth No. 8 would be directly bonded using a direct composite resin (Venus Diamond, Heraeus Kulzer, South Bend, Ind.). A multilayering technique would be used to mirror the incisal translucency and incisal halo observed in the contralateral central incisor, creating a seamless tooth/restorative

interface. To extend the longevity of the composite used to lengthen the anterior tooth, protrusive contact would be kept broad (i.e., flat incisal planes on the maxillary teeth that are in contact with the flat incisal planes on the mandibular incisors) and allow for slightly less (i.e., 15 micron using shimstock foil) contact on the restored tooth.

Positioning teeth Nos. 7 and 10 (i.e., the peg laterals) slightly to the lingual with orthodontics created an ideal environment for “no-prep” veneers. Other considerations for minimally invasive preparations include the correct axial inclination, line angles, proportions, and gingival symmetry.<sup>13</sup>

#### Clinical Technique

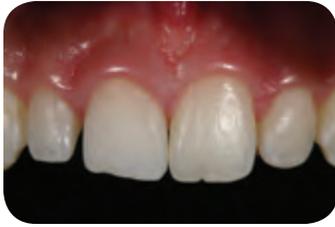
Prior to removing the orthodontic brackets, a preoperative model of the dentition was used to mock-up the case to ensure that the teeth were in the most ideal position and verify the accuracy of their alignment, arrangement, and incisal plane. The number of teeth that needed to be restored also was analyzed. Only minimally invasive procedures, including no-prep veneers on the lateral incisors and direct bond-

ing on tooth No. 8 and potentially the canines were discussed with the patient.

After the braces were removed, the patient's teeth were bleached using a take-home whitening kit (DayWhite ACP 7.5 percent, Discus Dental, Culver City, Calif.) for two weeks. The two-week stabilization period was provided to allow for the relapse of color and ideal bondable enamel.<sup>19</sup>

During the first restorative appointment, the shade was selected using a spectrophotometer (EasyShade Spectrophotometer, Vident, Brea, Calif.). Colors were mapped, and tooth No. 8 was cosmetically bonded. Additionally, the prototype restorations for teeth Nos. 7 and 10 were fabricated. The spectrophotometer confirmed that the required shades taken visually using the 3D Master Shade Guide (Vident) were shade A-1 (1M1.5), shade B-1 (1M1), and shade B-1 (0.5M1) in order to reproduce tooth No. 8 from the gingiva to incisal edge.

To create the restoration for tooth No. 8, shade A-1 enamel was used as a dentin replacement, then shade B-1, and finally incisal translucency composite (Venus Diamond, Heraeus Kulzer, South Bend, Ind.) were layered (FIGURES 14 THROUGH 18). Typically, a



**FIGURE 14.** Close-up preoperative view of teeth Nos. 7 and 10, with tooth No. 8 etched in preparation for composite bonding.



**FIGURE 15.** The dentin replacement layer in shade A-1 (Venus Diamond, Heraeus) was placed.



**FIGURE 16.** The translucent layer in the Clear shade (Venus Diamond, Heraeus) was established to mirror the incisal effects in the contralateral tooth No. 9.



**FIGURE 17.** The enamel layer in shade B-1 (Venus Diamond, Heraeus) was placed to mirror the outline form of tooth No. 9.



**FIGURE 18.** The initial bonding appointment achieved harmony and balance with a seamless direct composite technique. Microesthetic characteristics of incisal edge form and translucency were re-established in the tooth.



**FIGURE 19.**

**FIGURES 19 AND 20.** Reversible hydrocolloid and PVS (FlexiTime) impressions were taken for the no-prep veneers for teeth Nos. 7 and 10.



**FIGURE 20.**

minimum of three shades of composite are needed to build in dentinal lobes and any desired incisal edge effects.<sup>20</sup>

To maximize the esthetics, this author advocates two appointments for direct composite restorations. In this case, the first appointment achieved more than 80 percent of the desired outcome. Through the use of dental photography and a critical eye, necessary changes were mapped out and executed at the second appointment. A bur kit (UCLA Anterior Aesthetic Restorative Kit by the author, Brasseler, Savannah, Ga.), disc polishing kit (Bisco), polishing paste (Enamelize, Cosmedent, Inc., Chicago, Ill.), and a low viscosity liquid glaze (BisCover LV, Bisco, Inc.,

Schaumburg, Ill.) were used to perform the contouring, finishing, and high polishing steps and impart the appropriate luster to the direct composite restoration.

Once the composite restoration on No. 8 was complete, the prototype mock-up for the veneers was initiated chairside using a “squash” technique. This technique involved rolling a small amount of shade B-1 dentin composite (Venus Diamond) in clean, gloved hands and applying it directly to the spot-etched teeth Nos. 7 and 10. This composite was then sculpted to the desired outline form, contoured to the desired look, and light cured. The occlusion was checked in MIP and excursive.

Prototype restorations are essentially provisional restorations designed and created to the specifications of the anticipated definitive restorations. In this, as in other esthetic cases, they were used to test and verify that they accomplished the desired esthetic and functional outcomes.

The patient returned two weeks later very satisfied with the results and ready to proceed with the definitive veneer restorations. A small void was noted in the composite on tooth No. 8, so a slight repair and resurfacing were performed while final contouring and appropriate luster and polishing procedures were completed. The provisional/prototype restorations were gently removed using a spoon excavator or scaler. No preparation was needed for teeth Nos. 7 and 10 as confirmed by the prototypes, and a finishing diamond bur (No. 8863-012 Brasseler) was run very lightly across the teeth to remove aprismatic enamel and create more surface area for bonding.

A viscous paste (Expasyl, Kerr Corporation, Orange, Calif.) was used to retract the gingival tissue in order to capture the emergence profile of the natural teeth. The final impressions were taken using a polyvinyl siloxane (PVS) material (Heraeus) and reversible hydrocolloid materials (Slate maximum strength reversible hydrocolloid, Dux Dental; pink Syringe Sticks, Van-R) (**FIGURES 19 AND 20**).

Next, a “shrink wrap” technique was used to create bis-acrylic provisionals. First, a preoperative alginate impression of the approved prototypes was taken so that the provisionals could be quickly reproduced in bis-acrylic temporary material (ProTemp Garant III, 3M). Teeth



FIGURE 21.

**FIGURES 21 AND 22.** Shade communication with ceramist included properly exposed and underexposed photographs with the shade tabs 1M1 and 1M2 to aid the ceramist in accurate reproduction of value and chroma. By underexposing the image, color, value, and internal maverick colors can be evaluated more easily.



FIGURE 22.



**FIGURE 23.** Additionally, shade tab 0M3 was shown as a reference, keeping the shade tabs in the same plane as the teeth.



FIGURE 24.

**FIGURES 24 AND 25.** Eventually the approved prototypes were locked on using a bis-acrylic material (Integrity, shade A1), which were used as a guide for the ceramist when fabricating the no-prep veneers for teeth Nos. 7 and 10.



FIGURE 25.

Nos. 7 and 10 were spot etched, and an adhesive bonding agent (OptiBond Solo Plus, Kerr Corporation) was applied. Then, the bis-acrylic was syringed into the alginate impression (teeth Nos. 7 and 10) and placed in the mouth for two minutes. This allowed the material to shrink and conform to the teeth very well. With this technique, minimal contouring and finishing is necessary. "Shrink wrapping" the bis-acrylic to the teeth produced an esthetic provisional result.

Good communication with the dental ceramist included dental photographs (**FIGURES 21 THROUGH 23**), a detailed prescription, and a model of the approved prototypes (**FIGURES 24 AND 25**). The indirect "no-prep" veneers would then be fabricated with porcelain (Creation, Jensen Dental, North Haven, Conn.) on a refractory die by Burbank Dental Lab.

### Seating Appointment

At the try-in/seating appointment, an impression of the prototypes was taken for use as a back-up in the event that the restorations were not acceptable for

any restorative or esthetic reasons. The contour of the direct composite restoration on tooth No. 8 was modified minimally and brought to its final polish.

Following removal of the prototype restorations, the tooth preparations were cleaned and the final porcelain veneers were tried in (**FIGURES 26 THROUGH 30**). Photographs were taken, and the patient and his mother were given time to determine if the restorations met their expectations. After patient approval, the cementation process was initiated.

With proper isolation (i.e., preferably a rubber dam), the preparations were etched with 37 percent phosphoric acid for 30 seconds, rinsed, and dried (**FIGURES 31 AND 32**). The capacity for microretentive adhesion of porcelain to enamel is irrefutable and has been documented in the literature for more than 20 years.<sup>21</sup> Therefore, this is one of the primary reasons that no-prep veneers are the treatment option of choice when indicated.

The primer in the adhesive system (All-Bond 3) was applied and agitated for 30 seconds (**FIGURE 33**). The primer

was air-dried and the teeth were light-cured (**FIGURE 34**). The primer has been described as a necessary contaminant, since it is essential for achieving adequate infiltration of the adhesive into the inter- and peritubular dentin, but also is a contaminant if the solvent does not evaporate completely.<sup>22</sup>

The feldspathic veneers were etched with 9 percent hydrofluoric acid for two minutes, rinsed, and dried. They were then silanated (Silane A & B, Bisco), allowed to air evaporate for two minutes, and then completely air-dried. A bonding agent from the adhesive system (All-Bond 3) was judiciously applied to the veneers (**FIGURE 35**), after which a composite (Herculite) of the shade of the veneers, warmed using the Calumet composite warming system, was placed as a thin film onto them (**FIGURE 36**).

The bonding agent and a ribbon of warm composite were placed onto the tooth to seat the veneers. The veneers were seated, pressure applied, and excess cement was wiped from the margins. This process is repeated until no visible cement extrudes from the margins (**FIGURE 37**). The veneers were spot-cured, and excess cement was cleaved away (**FIGURE 38**). It is recommended the gingival margins, especially if subgingival, be ideal so that no smoothing with burs is required at this appointment.

All other porcelain tooth interfaces were smoothed and polished to a seamless, undetectable margin using a sequence of coarse to fine diamonds, rubber polishing points, cups, and wheel. The composite cement was fully cured by light curing the veneers for approxi-



**FIGURE 26.** Close-up of teeth Nos. 7 and 10 with Expasyl placed for atraumatic gingival retraction. Notice the blanched tissues indicating subgingival retraction.



**FIGURE 27.** Close-up view of the veneers prior to cementation. Notice the marginal integrity and thinness of the porcelain that was achieved by Burbank Dental using a platinum foil technique.



**FIGURE 28.** Close-up view of the try-in of veneer No. 7 with rubber dam isolation.



**FIGURE 29.** Close-up of the no-prep veneer for tooth No. 7 with rubber dam isolation.



**FIGURE 30.** The teeth were pumiced to cleanse the surface prior to cementation. Notice the plumber tape (Teflon) to allow for easy clean-up and no sticking of the cement to the adjacent teeth.



**FIGURE 31.** Teeth Nos. 7 and 10 were acid-etched with 37 percent phosphoric acid.



**FIGURE 32.** View of the etched enamel.



**FIGURE 33.** The adhesive primer (All-Bond 3 A & B Primer) was applied and agitated for 30 seconds.



**FIGURE 34.** The primer was light-cured after blowing/drying to remove the solvent (necessary contaminant).



**FIGURE 35.** A very thin application of adhesive resin (All-Bond 3) was placed in the veneers.



**FIGURE 36.** A ribbon of composite (Herculite, shade A-1 dentin) was warmed to increase viscosity and applied to the veneers and tooth after which they were fully seated.

mately two to five minutes in multiple, rotated motions (**FIGURE 39**). Note that the shade of the veneer and thickness of the porcelain material help to guide the curing time.<sup>23,24</sup>

To ensure a successful long-term outcome (**FIGURES 40 AND 41**), it was imperative to perform a final check of occlusion in MIP/CR and protrusive and lateral excursions. All margins were also checked for excess cement and confirmed with interproximal flossing. After postoperative instructions were reviewed with the patient, impressions were taken for fabricating a sports-guard and a modified maxillary nightguard appliance (Tanner).

The patient was very satisfied with the final result and returned approximately two weeks later for a re-evaluation of the occlusion, gingival response, and the esthetic parameters (**FIGURES 42 THROUGH 44**).

## Case No. 2

Similar procedures were followed in the case of a female patient in her early 40s. Following a thorough examination that included photographs, alginate impressions, and mounted study models, it was determined the patient could benefit from no-prep veneers on teeth Nos. 7 through 10 (**FIGURES 45 AND 46**).

The prototype mock-up for the veneers was carried out indirectly by the ceramist. Starting with a wax-up on the mounted study models and then using heat and pressure to cure the acrylic material, a prototype was ready for chairside try-in and delivery (**FIGURE 46**). Because the treatment in this case would be performed exclusively as an additive technique, no preparation was performed to any of the restored teeth.



**FIGURE 37.** Cement extrusion was visible around all margins.



**FIGURE 38.** Easy clean up with an explorer was possible due to the use of warm composite as the cement.



**FIGURE 39.** The composite cement was light-cured.



**FIGURE 40.** Close-up view of the veneer on tooth No. 7 after cementation.



**FIGURE 41.** View of the patient smiling the day of veneer cementation.



**FIGURE 42.**

**FIGURES 42-44.** Twelve days after delivery, these postoperative center, right lateral, and left lateral smile views of this 17-year-old patient demonstrate harmony and balance.



**FIGURE 43.**



**FIGURE 44.**

The prototype restorations were designed and created to the specifications of the anticipated definitive restorations in order for the patient and dentist to test and verify they accomplished the desired esthetic and functional outcomes (**FIGURE 47**). The patient returned recently very satisfied with the results of the prototype restorations and ready to proceed with the definitive veneer restorations.

### Conclusion

Since the late 1970s, minimally invasive dentistry has advanced to a significant degree. An enormous amount of research has emerged in support of adhesive bonding. Materials have improved and clinical performance has advanced to enable the use of minimally invasive porcelain veneers whenever indicated. However, it is important to note that the “no-prep”

option is not indicated for all clinical situations, and it requires an additional skill set for diagnosis and, in particular, the delivery of the veneers when it comes to finishing and polishing the porcelain in the mouth.

The concept of no-preparation or minimal preparation is more than 25 years old, yet today, the interest in conservative treatments and minimal intervention is being revisited. Dentistry embraces



**FIGURE 45.** Close-up preoperative view of the patient's maxillary anterior dentition. Teeth Nos. 7 through 10 would be restored with no-prep veneers.



**FIGURE 46.** View of the four prototype veneer restorations on the model.



**FIGURE 47.** Close-up view of the patient's natural smile with prototype restorations in place. This treatment was performed exclusively as an additive technique, with no preparation performed to any of the restored teeth.

contemporary restorative materials — such as thinner ceramic veneers and adhesive bonding agents — that do not require aggressive preparation designs, and keep the preparations in enamel. The experience and professional knowledge of the clinician will help determine the appropriate treatment plan based on the patient's clinical situation and esthetic demands. Of paramount importance to this process is communication with the laboratory, as well as the use of prototype restorations, which are created to ensure that the ultimate final restorations meet and exceed the patient's expectations for esthetics and functionality.

This article has reviewed the history of the veneer modality, its role as a conservative and minimally invasive treatment, and the clinical step-by-step protocol that should be implemented to ensure proper treatment planning and material selection for specific minimal-preparation indications. ■■■■

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