No-Preparation Porcelain Veneers

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4/1/2009
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Direct resin veneers followed by porcelain veneers were introduced in the early 1980s, and have undergone an evolution of both techniques and materials. When veneers were first introduced, no preparation at all or conservative tooth preparation was suggested.\(^1\), \(^2\) When porcelain veneers were introduced as a treatment modality almost 30 years ago, there were concerns that a thin porcelain facing would fracture during function; this fear caused some clinicians to recommend routine tooth preparations of 0.5-1 mm without any evidence to support this view.\(^3\) However, long-term clinical studies confirmed excellent durability and success of the porcelain veneer restoration.\(^4\) Nevertheless, one of the most important considerations in the success of the veneers was tooth preparation.\(^3\), \(^5\)

Minimal-preparation to no-preparation veneers have resurfaced in the dental literature as topics for clinical discussion. Recent marketing and advertisements by dental manufactures and laboratories aimed at the public and the profession recommend no-preparation veneers as the optimum option to conserve the tooth structure and achieve the most esthetic results compared to conventional tooth preparation veneers.\(^6\)-\(^11\)

No-preparation or minimally invasive veneers are veneers that have ultra-thin or “Contact lens” thickness\(^12\) of 0.3-0.5 mm.\(^3\), \(^13\)

It has been observed that many patients who have received veneers may not have been educated about more conservative treatment options before accepting ceramic veneers as a treatment
modality. Depending on the case and the desired results, the clinicians can provide a range of conservative treatments or combination of some of these conservative treatments: bleaching only, minor orthodontics, esthetic recontouring of teeth, esthetic recontouring of gingival tissue, directly placed resin composite veneers, no-preparation porcelain veneers, enamel only preparation veneers, varied levels of dentin veneer preparation and interproximal extensions.

**Advantages:**

1. Painless.  
2. Lack of need for anesthesia.  
3. Fast technique.  
4. Conservation of the tooth structure.  
5. No harm to the pulp and therefore elimination of post operative sensitivity.  
6. Ease of impression, because tissue management is not needed.  
7. No need for provisionals.  
8. Permanently whiten teeth.  
10. Longer-lasting restorations due to enamel bonding.  
11. Minimal flexing stress due to bonding to enamel.  
12. Higher level of acceptance by the patients, specifically patients with dental phobia or refuse to remove sound tooth structure.  
13. Excellent esthetic.  
14. Resistant to permanent staining.
15. Easy to clean and maintain when placed supragingivally.²⁵, ²⁷

16. Can be placed over unattractive crowns and bridges without replacing them.¹², ²¹, ²⁴, ²⁸

This has been reported mostly as case reports and there is not much literature about this advantage.

17. Reversible (if necessary).³, ¹², ²¹, ²⁴

Lots of manufactures claim this advantage of no-preparation veneers of being reversible, but it is not easy to remove the veneer and resin cement without touching the enamel. Therefore, it may not be a true advantage that the no-preparation veneers are reversible. I think that this advantage is mostly a marketing claim to attract patients to seek the no-preparation veneer treatment. Moreover, the need to remove these veneers means that the patient wasn’t satisfied with the results or that the case has failed.

**Disadvantages:**

1. Bulky appearance:

For no-preparation veneers, the esthetic results are variable; some of these restorations appeared too bulky and over contoured,¹ ²² while others have relatively acceptable esthetics.¹ ³ To maintain the original tooth shape, it often requires the clinician to remove a slight-to-moderate amount of enamel when making the tooth preparations.¹ ¹⁶ However, in order to avoid tooth sensitivity and pulpal death, tooth preparation should be made in enamel whenever possible. Nevertheless, bulky veneers should be avoided, because they appear false to the observers.¹⁴ Therefore, flattening of prominent cervical contours must be done to avoid overcontouring of the veneer.³ Some clinicians feel that there is a more optimum esthetic potential when teeth are prepared with a light chamfer especially at the
gingival margin to prevent overcontouring in that region, which is a debatable view.\textsuperscript{1, 16}

When it comes to the laboratory work, it is very difficult to fabricate a veneer less than 0.3 mm thick.\textsuperscript{16}

2. Periodontal problems due to overcontouring of the veneer:\textsuperscript{3}

   However, in a study done by Yu et al comparing teeth restored with porcelain veneers, both with and without preparation, it was reported that there were no differences in terms of periodontal health.\textsuperscript{29}

3. Teeth width being restored cannot be altered significantly.\textsuperscript{7, 18, 30, 31}

4. Difficult to mask severe staining and discoloration with thin veneers (Such as severe tetracycline staining)\textsuperscript{3, 7, 14} without adding thickness to the veneer.\textsuperscript{7}

   If thin veneers were constructed, the final result in these cases is often compromised because of the use of underlying opaque porcelains, the veneers will exhibit very high value and lack of vitality.\textsuperscript{3} The color discrepancy is due to the relative thinness of the veneer and the light passing through it can make the color of the underlying preparation show through.\textsuperscript{32} If the patient requests a significant shade change, the dentist must overcome that by increasing the thickness of the restoration by deepening the preparation.\textsuperscript{3, 33, 34} This will allow room for the technician to block out the underlying tooth color and achieve the desired color change.\textsuperscript{7}

A study was conducted in 2005 by Chen J et al, on 546 tetracycline-stained teeth restored with Cerinate porcelain veneer on teeth reduced approximately 0.75 mm incisally and 0.25 cervically, and bonded using Den-Mat Ultra-bond, a dual-curing composite resin, which contains an opaque component. Cutting the labial enamel may give space for
veneer restoration, which is important for color correction and maintaining arch form. The research indicated that Cerinate porcelain veneer restoration system is a reliable and ideal choice for the correction of tetracycline-stained teeth.  

Indications for No-Preparation or Minimally Invasive Porcelain Veneers:

1. Upgrading and enhancing a patients’ appearance is the primarily for the purpose of placing ceramic veneers.  
2. Minor color changes.  
3. Masking mild to moderate tooth discoloration and staining.  
   Eg: enamel hypoplasia, enamel hypocalcifications, discolorations due to endodontic staining, teeth with localized enamel malformations, fluorosis with enamel mottling, tetracycline staining).  
5. Closing diastemas.  
6. Restoring chipped or cracked teeth.  
7. Reshaping peg-shaped and undersized teeth.  
   Small or lingually positioned teeth should be considered ideal candidates for techniques involving no or minimal preparation. Many patients may be satisfied with limited improvement in their smile to preserve as much of the original tooth structure as possible.  
8. Correcting minor misalignments and rotations of anterior teeth.  
9. Recontouring of teeth.  
10. Revitalizing existing porcelain and porcelain-metal restorations. 
However, as it was stated earlier in the advantages, this is not supported much by evidence. There are only few case reports regarding this advantage or indication. Den-Mat recommends placing lumineers over all units of the existing bridge or crowns, because the results would be more satisfactory compared to placing a single lumineer over the defective existing unit. And care should be taken when matching the shade if a single lumineer is placed.\textsuperscript{12}

11. Worn dentition.\textsuperscript{8,12,15}

12. Adolescent dentition.\textsuperscript{12}

   Damaged smile from childhood accidents can be improved.\textsuperscript{12}

13. Pre-adolescent teeth.\textsuperscript{12}

   Chipping and cracking can be restored.\textsuperscript{12}

Generally, minority of cases are considered as ideal for no-prep cases. They are:

1. Individuals with pleasing teeth arrangements.\textsuperscript{6}

2. Minor tooth damage and discolorations that is able to tolerate an increase in tooth bulk.\textsuperscript{6}

And a larger group of patients presents as minimal-preparation cases. They are cases that are similar to no-preparation cases, but with minor space issues.\textsuperscript{6}

However, the majority group of people seeking smile alterations are people with excessive wear, large class III restorations, and space management issues.\textsuperscript{6}
**Contraindications:**

1. Severe discoloration or darkly stained teeth.
2. Protruding teeth or crowding that will require some reduction to achieve better esthetics and function.\(^{39}\)
3. Insufficient enamel remaining to provide adequate retention.\(^ {40}\)
4. If teeth are significantly broken down or compromised. In this case, crowns are a better and stronger alternative than ceramic veneers.\(^ {8}\)
5. Large class IV defects, because of the large amount of unsupported porcelain and lack of tooth-colored backing.\(^ {40}\)
6. In large diastemas, the amount of unsupported porcelain should be carefully evaluated.\(^ {40}\)
7. Bruxer or clencher patients. Those patients have increased chance of veneer fracture even if incisal edge is not covered by porcelain.\(^ {22, 41}\)

**Some Examples of No-Preparation Veneer or Minimal Preparation Products:**

1. Lumineers by Cerinate:

   Manufactured from Den-Mat and is the most popular no-preparation veneer.\(^ {12}\)

   *Cerinate Porcelain by Den-Mat:*

   The advances in Den-Mat porcelain technology and custom-designing bonding systems allowed them to produce an exceptionally thin veneer that can maintain its durability because of the exceptionally high strength porcelain called Cerinate porcelain.\(^ {24, 25, 42}\) Cerinate porcelain is a translucent leucite-based\(^ {25, 43}\) feldspathic\(^ {26}\),\(^ {42}\) porcelain with very small porcelain size,\(^ {25, 43}\) a strength approaching that or as
strong as aluminum oxide-reinforced porcelains\textsuperscript{26, 42} and highly esthetic material.\textsuperscript{44} It is available in stackable or pressable porcelain.\textsuperscript{25}

A study was conducted to evaluate the bond strength of the Cerinate porcelain with Ultra-Bond, and the results showed a high bond strength of Ultra-Bond with definite post-light exposure curing.\textsuperscript{45}

Den-Mat website states that veneer thickness can range from 0.3-0.5 mm, and for that thickness range, there is no need to prepare the tooth in order to accommodate the veneer thickness. And the veneers could be simply bounded to the tooth with superior esthetic results and without being uncomfortable or noticeable of its thickness by the patient or affecting the emergence profile.\textsuperscript{24}

In a clinical study done by Strassler on 30 patients, 167 Cerinate Lumineers placed with Ultra-Bond. 78\% were considered as minimally invasive because there was either no preparation or minimal preparation and reshaping on teeth to correct slight and minimal misalignments and incisal edge discrepancies. The veneers were monitored for 20 years. They evaluated color stability, marginal integrity, marginal discoloration and secondary caries. The results revealed 94\% of the veneers were clinically successful, only 10 Lumineers out of 167 needed replacement due to chipping or cracking on stress-bearing areas. Therefore, the results indicated that Cerinate Lumineers cemented with Ultra-Bond were very successful.\textsuperscript{46}
Moreover, in a 20 year case study evaluating Cerinate veneers with Ultra-Bond, the veneers were replaced due to wear. There was no evidence of microleakage, gingival recession, cracks or fractures.\textsuperscript{47}

Several studies were performed on Lumineer Cerinate porcelain no-preparation veneers and others compared no-preparation veneers with conventional veneers. Those studies evaluated different parameters: color stability,\textsuperscript{46, 48-51} marginal integrity,\textsuperscript{48, 49} marginal discoloration,\textsuperscript{46, 48-50} secondary caries,\textsuperscript{36, 49} porcelain fracture,\textsuperscript{51} resistance to microcracking after thermocycling,\textsuperscript{52} wear,\textsuperscript{50} and periodontal health.\textsuperscript{29, 51} The results were favorable for the no-preparation veneers compared to conventional veneers. Moreover, there are many published case reports that had very good results favoring the no-prep veneers.\textsuperscript{13, 25, 50, 53-55}

2. Vivaneers:
   a. Manufactured by Glidewell Labs using high strength pre-blended leucite-reinforced pressed ceramic ingot called: Prismatik ThinPress.\textsuperscript{56}
   b. Can be fabricated as thin as 0.3 mm.\textsuperscript{56}
   c. Minimal preparation of 0.3 mm for protruding areas allows an ideal facial alignment.\textsuperscript{22}
   d. Available in 12 shades of the most popular bleach and shade guides.\textsuperscript{56}

3. DURAthin Veneers:\textsuperscript{15}
   Very thin porcelain veneers.\textsuperscript{11}
4. daVinci Veneers:\textsuperscript{23}

5. MAC Veneers (Micro Advanced Cosmetic Division Veneers):\textsuperscript{23, 57}
   a. Produced by MicroDental laboratory.\textsuperscript{57}
   b. Made from pressed ceramic.\textsuperscript{57}
   c. Stronger, denser, and thicker than traditional porcelain veneers, therefore, they are not easily dislodged.\textsuperscript{57}
   d. Stain resistant.\textsuperscript{57}
   e. Needs tooth preparation.\textsuperscript{57}

6. IPS e.max Press lithium disilicate veneers:\textsuperscript{15, 41}
   a. Available either as ingots for pressing, or as blocks that can be milled by CAD/CAM milling machines.\textsuperscript{41}
   b. Mostly used for crowns and bridges.\textsuperscript{41}
   c. Indicated for veneers when combined with adjacent IPS e.max bridges or crowns.\textsuperscript{41}

All of the previous products websites have the same advertising claims previously discussed in the advantages, and indications. However, there is very little evidence in the literature about these types of veneers, except for Lumineers by Cerinate which has more evidence in the literature.
Steps of Placement Techniques:

Usually three visits are required for no-preparation or minimal preparation veneers:

1. Diagnosis and treatment planning.\textsuperscript{12, 23, 27}
2. Preparation (if needed) and impression.\textsuperscript{12, 23, 27}
3. Cementation.\textsuperscript{12, 23, 27}

Each step will be discussed in details:

\textbf{1. First Visit: Diagnosis and treatment planning.}\textsuperscript{12, 23, 27}

Before advising any patient regarding treatment options in any esthetic case, the dentist should complete a complete facial and dental analysis, which should include:

1. Evaluation of the patient’s requests and expectations.\textsuperscript{7, 58, 59}
2. Periodontal examination.\textsuperscript{3, 7}
3. Photographs.\textsuperscript{7}
4. Radiographs.\textsuperscript{7}
5. Mounted models and waxing-up.\textsuperscript{5, 7}

   It gives the clinician and the patient a general idea about the final appearance of the case.\textsuperscript{5}

There are main factors to consider when planning an esthetic treatment and the amount of tooth preparation required for a porcelain veneer. They are:\textsuperscript{3, 7}

\textit{a. The expectations of the patient:}

The clinician should fully understand patients’ esthetic objectives and concerns before starting any procedure.\textsuperscript{60, 61}
b. **Midline position:**

To insure patient satisfaction, the clinician must inform the patient of his or her midline position before treatment begins, even though correction with veneers may not be possible.\(^7\) Although midline appearance can be altered via restorations, the gingival tissue will not adjust to significant changes.\(^{62-64}\) To accomplish any alteration of the midline, interproximal preparation is required. If no preparation is done, the laboratory technician will have to place the midline in the previous location with the same degree of angulation.\(^7\)

c. **Lip position and fullness:**

In a patient with thin lips, changes in the arrangement of the teeth may alter lip support and position, possibly leading to the patient’s having problems with facial esthetics, speech and/or lip closure.\(^{65, 66}\) If the patient’s teeth are crooked or rotated and the clinician is considering placing veneers with no preparation, the clinician should note the most facial position of the teeth requiring restoration; this is because all the other surfaces of the teeth will need to be build out to the most facial point.\(^7\) Even when a minimally thick (0.3mm) porcelain veneer is used, this can result in certain areas of the restoration’s being quite bulky.\(^7\) However, thick lips are less affected by the thickness of the restorations.\(^{65, 66}\)

d. **Incisal edge position:**

The incisal edge of the maxillary central incisors is the most important determinant in smile creation. Once the incisal edge is determined, it serves to establish the proper
proportions of the teeth and the levels of the gingiva. Sometimes, altering the incisal edge position is often necessary to produce a more youthful and attractive appearance. Moreover, when lengthening anterior teeth, the clinician must consider phonetics and occlusion in addition to the esthetic evaluation.

e. Desired teeth shapes and contours:

When a patient desires to change the size, shape or contours of teeth, the clinician must pay detailed attention to preparation design. The clinician should make sure that the patient is aware of the esthetic restrictions that can arise from asymmetrical or misaligned teeth, and the patient must also understand that the width of the teeth being restored cannot be significantly altered. Therefore, veneer thickness, which relates to tooth reduction, is largely determined by tooth position for esthetics.

f. Occlusion:

When altering teeth’s position and shape, the clinician should take care not to violate the principles of occlusion, such as anterior guidance or pathways of motion.

g. Desired color:

The color of porcelain veneers does not always meet patients’ expectations; this dissatisfaction can lead to failure of the case. Generally, a veneer requires a minimum of 0.2-0.3 mm thickness or tooth reduction for each shade change. Therefore, the amount of shade change desired is also largely determined by veneer thickness which is related to tooth reduction.
After completing the smile analysis and the practitioner has determined the ideal, final position and shape of the teeth to be restored, then the clinician can determine the necessary amount of reduction or the most appropriate type of veneering porcelain according to the patient’s specific esthetic condition and desires and cannot be generalized as a single treatment to use in every situation.

Many clinicians have advocated minor adjustment of selected locations of enamel, or no preparation at all. However, in a study conducted by Cho in 1998, stated that minor or no preparation will probably lead to inferior esthetics, and may lead to compromised strength and periodontal response. Also, Cho stated in the same study that adequate tooth preparation is one of the keys to success of porcelain veneers and recommended 0.5 mm labial reduction and terminating in a chamfer margin slightly supragingivally.

Conversely, the preparation does not depend on the specific brand of porcelain, but rather the best material or technique should be chosen for the existing clinical situation. Unfortunately, frequently excessive tooth structure is removed so that a specific material or technique can be used, although another technique or material would have been a more conservative option.

2. **Second Visit:**

a. **Preparation (if needed):**

   The concept of no-preparation veneer is not always practical and to improve the outcome, some degree of tooth preparation is often necessary.
I. *The No-Prep Technique:*\textsuperscript{12}

- No removal of any tooth structure and veneers are placed over existing tooth structure.
- Therefore, no anesthesia or temporaries are needed.
- The veneer thickness can be 0.2-0.7 mm.

Den-Mat website stated that most of the patients fit this technique.\textsuperscript{12}

II. *The Minimal-Preparation Technique:*\textsuperscript{12}

- Only slight modification of enamel (0.3-0.5 mm) is reduced, and dentin is not touched.
- Therefore, there is no sensitivity.
- No anesthesia is needed.

Den-Mat website states that this technique is usually used on misaligned teeth.\textsuperscript{12}

A putty matrix or index may be used as a guide for the new position of teeth, and evaluate the space available to build out the teeth in the new position.\textsuperscript{7} If tooth preparation is needed the index could be used to locate the areas that needs modification.\textsuperscript{5}

b. **Impression:**\textsuperscript{12, 23, 27}

Excellent impressions are extremely important to make an excellent veneer.\textsuperscript{12}
No cord placement is necessary because there was no tooth preparation. And if minor preparation is done, it is usually supragingival.

3. **Third Visit: Bonding of the Veneers:** 12, 23, 27

Following the manufacturers instructions for bonding is very important and may vary from one product to another. The following technique is the general steps that would be followed for cementation of the veneers.

a. **Use of magnification:**

Den-Mat highly recommends the use of 4-power magnification or higher for Lumineers placement. 12

b. **Preparation of the Veneers:** 12

   I. Treatment of the veneers with porcelain conditioner for 30 sec, then rinsing and drying.

   II. Apply primer for 30 seconds and thin it.

c. **Try-In of the Veneers:** 12

   This step is important for patient satisfaction and acceptance. 12 The veneers are first tried in with water 40 or try-on paste to determine the optimum shade match with the adjacent teeth. Some brands of veneer resin cements have excellent try-in gels that match the color of the cements well, while other brands of try-in gels do not match the color of final set cement. 74, 75
If the shade match is perfect, then a clear resin can be used for final cementation. If the shade needs to be modified, chemical cured resin can be evaluated until fit and color are approved.

After the shade is well accepted by the patient, the resin is removed and the veneers are cleaned using acetone or water. However, the internal surface of the veneer do not need to be treated.

d. Preparation of the tooth surface:

I. Cleaning of the tooth surface with polishing paste.
II. Etching of each tooth for 20 seconds.
III. Applying adhesive.

When bonding porcelain to a porcelain surface, sandblasting to roughen the porcelain surface is needed.

e. Bonding of Lumineers:

I. Selection of the proper shade of resin cement.

Ultra-Bond by Den-Mat is used for cementation of Lumineers. Den-Mat has some resin cement products that help in color modification if the shade is off. Some of these products are: opaquers, tints and shade modifiers, opaque resin cement which combines the esthetics of the Ultra-Bond with an opaquer power. The (Cerinate® Shade Modification Kit) is recommended by Den-Mat in cases such
as tetracycline staining, white fluorosis, and hypocalcification. It is important to know that the thicker the veneer is, the more opaque it appears, and the more important characterization is.12

II. Placement of the veneers:

There is no finish line in the no-preparation veneers, so assurance that the veneer is in the proper position is very important.76

When six anterior veneers are places, generally the centrals are cemented first, then the cuspids, and finally the lateral incisors.40

III. Remove excess cement around the veneers.

IV. Cure for few seconds.

V. Continue removing the excess.

VI. Continue curing.

f. Finishing:12

I. All excess cement should be properly removed to maintain proper gingival health.

II. Interproximal surfaces are checked for smoothness using dental floss.

Cost of No-Preparation or Minimal-Preparation Veneers:

Different references and websites had different price lists of minimal or no-preparation veneers. The cost can be determined only after a complete evaluation of the dentist.77 No-preparation veneers have around the same cost range of traditional porcelain veneers. Examples are:
1. A single Lumineer may cost between $700-$1,200 per tooth\textsuperscript{77, 78} or even up to $2,000 depending on how many teeth are treated.\textsuperscript{79} While conventional porcelain veneers generally cost between $900 and $2,500 per tooth.\textsuperscript{78}

Lumineers by Cerinate has a five year warranty against defects in workmanship and materials.\textsuperscript{12}

2. Vivaneer cost a little less than Lumineers.\textsuperscript{80}

3. DURAtthin veneer cost the same as regular veneers, ranging between $1,000-$1,500 depending on the case.\textsuperscript{81}

As with most cosmetic dentistry treatments, typically dental insurance does not cover the cosmetic veneer procedure. Because dental insurance in intended to cover necessary dental health treatments, not those that are elective.\textsuperscript{15, 40}

**Summary:**

According to the supporting evidence, no-preparation veneers are indicated for selected cases only, and can’t be generalized for all patients seeking esthetic rehab and each case should be evaluated individually, regardless of the advertising claims. And generally speaking, a larger number of cases require some kind of tooth modification for superior esthetics, patient satisfaction, and better color change without affecting the thickness and emergence profile of the veneer. Therefore, a stronger emphasis on the concept of minimal-preparation veneers compared to no-preparation veneers is highly recommended.
References: