Veneers

Introduction

Recent public exposure via the media to various kinds of esthetic dentistry procedures has increased demand for veneers. In past years, full coverage restorations were often used to correct minor defects or to mask discoloration. However, the more conservative concept of veneering teeth has been around for some time.

In 1928, Charles Pincus introduced the porcelain ‘Hollywood Bridge’. These veneers were fabricated for actors and used only in front of the camera. The actors were instructed not to wear the veneers while eating since the veneers were not bonded. Nine years later, in 1937, Pincus also fabricated acrylic veneers. These veneers were retained by denture adhesive, but failed because there was no adhesion to the teeth.\footnote{1} In 1955, Michael Buonocore introduced enamel etching and in 1962, Ray Bowen developed composite materials. Dr. F. R. Faunce and Dr. D.R. Myers in 1976 tried acrylic veneers luted on etched enamel surfaces. In 1983, Dr. Harold Horn etched custom porcelain veneers luted to etched enamel surfaces.\footnote{2}
With the introduction of composite resin, etching, and bonding techniques, minor defects can be treated conservatively. While composite veneers have improved since their introduction, they still have a few drawbacks, such as wear, marginal and incisal edge fractures, and discoloration. As a result, composites may require more frequent replacement than is necessary with porcelain veneers.

Porcelain veneers are more stable and have better esthetics. If a porcelain veneer is bonded with a correct adhesive technique and optimal oral hygiene care is maintained, studies have shown that the long term survival rate of veneer is very high.³

**Types Of Veneers**

Veneers can be placed directly or indirectly. Composites are used for directly placed veneers, and a variety of materials can be used for indirectly placed veneers. These include:

1. Heat processed composites (e.g. Cristobal)
2. Conventional powder-slurry ceramic (feldspathic porcelain). This type of porcelain is layered on the refractory die by the lab technician.
3. Heat pressed ceramic. These products are melted at high temperatures and pressed into a mold created using the lost-wax technique (e.g., IPS Empress 1 and 2, OPC)
4. Machineable (CAD/CAM) ceramics (e.g., CEREC)
**Indications**

Veneers are used for functional and cosmetic correction of the following conditions:

1. Stained or darkened teeth  
2. Hypocalcification  
3. Multiple diastemas  
4. Peg laterals  
5. Chipped teeth  
6. Lingual positioned teeth  
7. Malposed teeth not requiring orthodontics

**Contraindications** for veneer placement include:

1. Insufficient tooth substrate  
2. Labial version  
3. Excessive interdental spacing  
4. Poor oral hygiene or caries  
5. Parafunctional habits (clenching, bruxism)  
6. Moderate to severe malposition or crowding

**Philosophy of Esthetic Dentistry**

- Recolor: The first option is tooth whitening  
- Reposition: The second option is orthodontic repositioning  
- Recontour: The third option is to recontour teeth and equilibrate  
- Restore: Once the above options have been explored, the last option is to restore the teeth with veneers or crowns.
Advantages of veneers include:

- Minimal tooth preparation required;
- Stronger and more durable than composite veneers;
- Alternative to full coverage restoration in case of incisal fractures or tooth discoloration;
- Color stability.

Disadvantages of veneers include:

- Potential for over contouring
- Requires laboratory procedures
- porcelain enamel margins may be thin and difficult to finish
- Brittle margins
- Pitting by acidulated fluoride treatment
- Cannot be repaired easily
- Can be difficult to temporize
- Color cannot be altered substantially after placement
- Placement is difficult and time-consuming

Treatment Plan Phase

It is important to confirm the following before starting the preparation:

1. Check for contraindications
2. Mount study casts
3. Check posterior occlusion (anterior teeth do not function alone)
4. Confirm that there is no protrusive or lateral interference.

5. Check centric anterior lingual contacts.

6. Consider three key elements of esthetics: contour, position and color.

When restoring anterior teeth with porcelain veneers you must be aware of:
incisal edge position; lingual contour; labial contour and inclination.

Clinical Procedure

Tooth #7 (left) and tooth #10 (right) were treatment planned for Empress Veneers. The teeth were whitened before veneer preparation.

Visit 1:
1. Impression for study models/bite registration record
2. Radiographs/photographs
3. Check contraindications
4. Shade selection

Shade is critical to outcome of the final restoration. There are many options to shading today.
- Vita Classic shade guide
- Vita 3D Master
Electronic shading has recently been introduced. Electronic shading requires that your lab be equipped with similar technology.

Visit 2:

1. Confirm shade selection
2. Preparation

In the early days of veneers, no to minimal tooth preparation was suggested. More recently dentists have been removing at least 0.5 mm-0.8 mm enamel. Removal of some enamel aids in achieving better bond strength, but care must be taken not to remove more than 0.5 mm-0.8 mm, especially in the proximal and cervical areas. Even though dentin adhesives have improved dramatically, porcelain bonding to enamel is better than porcelain bonding to dentin.
The armamentarium used includes 834/021 depth cut bur, 6801/016 round bur and 6856L/018 tapered bur (Brasseler USA, Savannah, Georgia).

**Depth Guide Cuts** - With a 834/021, 0.5 mm diamond depth cut bur, scribe horizontal depth cut grooves on the labial surface of any anterior tooth. Extend these grooves from mesial to distal, taking care not to damage the adjacent teeth that are not being prepared. It may be necessary to angle the bur in relation to the contour of the labial surface to achieve the appropriate depth for these guide cuts. The finish line of the preparation will end supragingivally, approximately 0.5 mm incisal to cemento-enamel junction (CEJ). Do not place your gingival depth cut so as to cut into the cemento enamel junction area.

Always examine study models prior to preparation in order to avoid over reducing area of the tooth that may be rotated lingually. The use of a reduction guide is recommended.

**Labial Reduction** - Using a 6856L/018 tapered diamond reduce the remaining labial tooth structure between the depth cuts. Simultaneously create a chamfer ending 0.5 mm incisal to the CEJ. This reduction should also extend interproximally without breaking through the contact areas.
TYPES OF VENEER PREPARATION

1. Incisal Chamfer preparation (Interlock prep)

   The incisal edge is not reduced in length. This is type of preparation is done in order to preserve the natural guiding palatal surface of the tooth which is important functionally. Add an additional space for the incisal porcelain by creating a chamfer along the facial incisal margin using the tip of 6856L/018 tapered diamond.

   #6 Incisal Chamfer preparation (Interlock prep), #7 Incisal Butt-joint preparation, #8 Incisal Lingual Wrap preparation, #9 depth cut.

2. Incisal Butt-joint Preparation

   Prepare 0.5 mm depth cut grooves in the incisal edge with 834/021 diamond. Using the 6856/018 diamond remove the remaining incisal tooth structure. Then round the facial incisal line angle leaving a butt joint margin along the lingual incisal edge. The incisal reduction should be 0.5 mm-1.0 mm. This type of preparation is done in order to increase the length of the tooth. The length can be increased from 0.5 to 2mm only.

3. Incisal Lingual Wrap Preparation

   Prepare 0.5 mm depth cuts in the incisal surface of tooth. Reduce the
incisal surface in a manner similar to incisal butt-joint preparation. Reduce the mesial incisal and the distal incisal corners an additional 0.5 mm. Then using the 6856/018 bur, extend the incisal chamfer to the palatal surface. This palatal chamfer should be a straight line mesial to distal. All incisal edges should be rounded. The lingual chamfer line on the wrap around preparation should be above or under the centric lingual contacts to avoid occlusal contact on the interface between porcelain and tooth structure. Contact should be either all on porcelain or on tooth structure. The incisal wrap prep is a popular option for several reasons. It can be used in most patients, easily fabricated by the technician and easier to handle by the dentist due to positive seating on delivery.

Tooth # 7 Incisal Lingual Wrap preparation
The path of insertion for veneers is in the labial or incisal-labial direction. All undercuts in relation to this path must be removed. A silicone reduction guide is used in order to check the amount of reduction required. The reduction guide is designed to evaluate the amount of reduction at the incisal, middle third and cervical third of the tooth. Use of a reduction guide is particularly important when teeth are misaligned.

Reduction guide designed in order to evaluate the amount of facial reduction at the incisal, mid and cervical thirds of the teeth.
Reduction Guide in order to evaluate the incisal reduction.

FINAL IMPRESSION

- Strip contact area using a finishing strip prior to impression to improve visualization for lab technician.
- A proper tray size should be used.
- Isolate and dry the preparation.
- Syringe polyether or polyvinyl siloxane impression material starting at the most distal embrasure on one side and work around the gingival surfaces of all prepared teeth to the most distal embrasure on the other.
- Seat the tray containing the impression material and hold in place until set.
- Remove and inspect the impression for details and accuracy.
Laboratory Instructions

A detailed prescription is written to the laboratory technicians

- **Temporization**
  - The impression is usually taken prior to temporization.
  - During the period a patient is in provisional veneers there is a likelihood of post operative sensitivity. Therefore application of a desensitizer is recommended before the fabrication of the provisionals in order to reduce the sensitivity.
  - Different techniques are used to fabricate provisional veneers. We recommend using a silicone putty impression material shell in order to fabricate temps, since it reproduces the wax up or study models very accurately.
  - A bis-acrylic temp material with the required shade is used. The provisional is not removed but is rather “locked in” as a result of shrinkage. The provisionals are then finished and polished.
    Evaluation of tooth reduction is confirmed by examining the temp for thin areas. Although it is unlikely to occur while using the reduction guide it is sometimes necessary to re-prep under-reduced areas. If this does occur then you must reimpress and retemp the prepared teeth
  - When fabricating a provisional for a peg lateral or any single tooth veneer, a free-hand composite veneer is recommended.
To maintain good periodontal health, the patient is told to irrigate the marginal area with a chlorhexidine rinse using an endodontic irrigating syringe.

Visit 3: Veneer Cementation

1. Try-In/Shade Selection:
   - Use flour of pumice to clean all prepared tooth surfaces and wash thoroughly.
   - Isolate and dry the teeth
   - Moisten the veneers with water and place them carefully on the prepared teeth to check fit and shade.
   - Try-in paste can be used behind facings to check shades.
   - If color adjustment is needed, select appropriate shade of try-In paste, apply to veneer, seat, and examine for color and fit.
   - Clean the veneers by rinsing with water
   - The veneers generally come etched with hydrofluoric acid. Therefore a 30 second application of 37% phosphoric acid is used only for cleaning, not for etching.
   - Rinse with water and dry.

2. Cementation
   - Apply silane to the etched porcelain surface for 60 seconds and air dry. Always confirm that your silane is not expired.
- Pumice and wash the tooth preparation dry and isolate the teeth.
- When cementing multiple veneers you must always start closest to the midline and work distally.
- Veneers are luted two at a time starting with the central incisors and continuing distally.
- Isolate the preparation interproximally with thin Mylar strips.
- Etch the preparation in the usual manner and dry the area.
- Apply enamel/dentin-bonding system according to the manufacturer's instructions. Light cure the tooth prior to seating the veneer.
- Apply unfilled resin (e.g., Single Bond, 3M/ESPE) to the tooth surface and inside of the laminate veneer. Do not cure this layer at this time.
- Apply composite-resin luting cement to the veneer and place the veneer onto the tooth in an inciso-gingival direction. Remove excess material gently with a resin-coated brush. Make sure that cement is visible at all the margins to avoid any voids.
- Hold the veneer and check the gingival margin for proper seating. Then, for each of the four regions (gingival, mesial, lingual-incisal and distal) remove any additional excess. Light-cure the gingival margins first for 10 seconds, mesial, incisal and distal. After curing these four areas, cure for 60 seconds through the facial surface.
• Light-cure each area and margin of the veneer for 30 seconds
  (longer for thicker or more opaque veneers, or darker shades).
  (Check manufacturers’ recommendations for curing time.)

Post-veneer cementation, tooth #7 (middle) and tooth #10 (right)

3. Finishing
• Remove gross excess using sharp hand instruments – CL carver or
  perio scaler.
• Using fine and extra fine diamond finishing burs remove excess
  resin gingivally and inciso-lingually.
• Finish the proximals using fine strips.
• Proceed to the next placement.
• Use porcelain polishing paste to regain a smooth porcelain surface
  whenever necessary
• Check occlusion in all excursions and adjust as needed.
References:


