

Dentistry Clinical

Clinical success with porcelain veneers

Dr Raymond Bertolotti takes us through this interesting case study

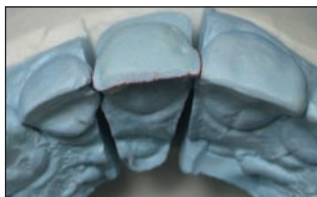


Figure 1: Incisal view of tooth preparation

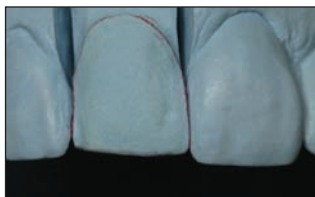


Figure 2: Facial view of tooth preparation



Figure 3: Blue blockout on the lingual



Figure 4: Putty with plastic food wrap



Figure 5: Final impression



Figure 6: Spot etching



Figure 7: Application of bonding agent



Figure 8: Impression removed from TurboTemp 2



Figure 9: Light curing through TurboTemp 2



Figure 10: Polishing with SpinBrite brushes



Figure 11: Completed temporary veneers



Figure 12: Two shades of Try-in Composite placed on a veneer



Figure 13: Veneer with two shades of Accolade PV Try-in Composite



Figure 14: Before treatment of non-vital tooth 11



Figure 15: Tooth preparation for veneer



Figure 16: Try-in with two shades of Try-in Composite (Light on distal, Translucent on mesial)



Figure 17: After treatment bonded with a 10/90% mix of Accolade PV Light and Translucent

After nearly 25 years of clinical experience with porcelain veneers, we really know a lot about them. We know how to prepare teeth for the strongest veneers. We know that unlike crowns that weaken teeth, veneered teeth can be equivalent in strength to natural teeth¹. We know that veneers can last for a very long time. Unlike crowns, the veneer shade may be 'dialed-in' at the bonding appointment, using a simple composite resin system. Many leading aesthetic dentists in North America and Europe now strongly prefer veneers over crowns. Even many Prosthodontist specialists, once resistant to the veneer concept, are now embracing facial-incisal veneers due to the fact that they do not alter the envelope of motion of the mandible. Some current concepts in porcelain veneers will now be reviewed with particular attention to recent advances in clinical procedures.

Smile design

The first consideration for an aesthetic veneer case is smile design. Aesthetics must be consistent with function. It is usually best to avoid computer simulations since they can over-promise. Instead, a composite mockup is made intraorally, using sculptable composites such as Show Off (Cosmedent) or Estelite Sigma (Tokuyama), which are placed and light cured without bonding. The patient is able to preview the simulation, 'live'. Second, we decide prep or no prep, and if prep how much? Should a tooth need to be shortened; blackening the cut off portion with an alcohol soluble marker pen will simulate the effect.

Tooth preparation

The 'Castelnuevo prep' design², that is 2mm of incisal free-standing porcelain, a lingual butt joint and a facial reduction of about half the enamel, results in optimal strength. A lingual chamfer was shown to actually reduce the strength of the veneer and complicates the path of insertion. The veneer should insert from the facial. Contacts are not routinely broken. Should your laboratory be unable to deal with separation of the teeth on the cast, just place a small section of metal matrix band between the teeth and make a 'pick up' impression. The stone cast will now have teeth separated by the metal matrix. It is helpful to punch two small holes on the matrix for best grip by the impression material.

Impression

An addition silicone (VPS) putty/wash is preferred for accuracy and ease of impression. It is best to first place the putty, before making the tooth preparation, using a cover of plastic food wrap (eg. Saran Wrap) on the putty. The plastic wrap provides space for the wash and eliminates putty getting into the interproximal areas. Danville's Star VPS putty does not stick to latex gloved fingers and its polymerisation is not appreciably affected by glove powder. After tooth preparation, the plastic wrap is removed from the putty, just before the final wash of light body. For the wash, Danville's fast-setting First Quarter Light works well but for multiple veneers, the slower setting Star VPS Light is more suitable.

To prevent tears on the impression material where it goes below the contact, it is helpful to place some Blue Blockout (Ultradent) to the lingual area and light cure it. The resulting impressions are very clear and free of tears.

Temporaries

A small spot in the centre of the facial surface is etched, and then a light curing enamel bond applied and light cured. It is important to avoid using a self-etching primer, to preclude a larger than desired bond spot. Oxygen inhibited, unpolymerised surface remains on the cured enamel bond. For one or two veneers, some Estelite Sigma (Tokuyama) composite is sculpted to the facial surface and light cured. Thus the composite is spot bonded. For a larger case, TurboTemp 2 (Danville) or similar cartridge delivered temporary composite is dispensed into a preliminary VPS impression. The preliminary impression is made after mocking up the teeth so that the proposed changes are in the temps. After the TurboTemp 2 is autocured for about two minutes, remove the impression and light cure through the TurboTemp 2. The previously placed bond attaches to the overlying composite temporary. Then polish with conventional composite polishing tools. When time to remove the temporaries, a simple pry with a curette will fracture off the temporary and a sand disc or air abrasion will remove the spot of bond from the enamel.

Try-in

For try-in, silane is placed on the HF lab-etched veneers while they are clean. Then add Accolade PV Try-in Composite to the silanated veneer. The veneer is tried in for fit and colour simultaneously. This Accolade PV Try-in is real composite but has no light sensitive initiators, thus allowing accurate colour evaluation with unlimited try-in time. Using a polymerisable composite rather than glycerine based try-in materials not only speeds the procedure but also eliminates the possibility of contamination by the try-in material. After try-in, the trick is to remove at least 50% of the non-catalysed Try-in Composite and then replace it with the normal catalysed Accolade PV composite. The remnant Try-in Composite is polymerised by what's known as 'diffusion polymerisation' when the regular Accolade PV composite is light cured. This concept is unique in the industry and is very highly recommended.

For further efficiency of try-in, a try-in with two shades of composite simultaneously may be done as illustrated below. By observing the two shades, the final shade may be 'dialed-in'. It might require a blend of shades or perhaps one in satisfactory. If there is more than one veneer, it may be best to try-in with different shades on each veneer. Sometimes it works to make just a 'right half' and a 'left half' on a big case. The unlimited try-in time allows the patient to take as much time as required for try-in and I proceed only when they are happy with the shade. No more free remakes! The patient 'buys the shade' before the veneers are bonded. The patient can take as much time as needed and signs

off on the final shade selected. The final shade is exactly the same as the try-in.

Bonding the veneers

After try-in is satisfactory and the patient 'buys the shade', the veneers with Try-in Composite are removed from the teeth. The teeth are pumiced with a prophyl cup to remove all Try-in Composite. The veneers are brushed with Prelude #2 Adhesive (included in Accolade PV kits), to dissolve most of the Try-in Composite and reach the silane layer. Then regular Accolade PV is placed on the veneers, not completely rid of Try-in Composite. The regular Accolade PV will fully cure the Try-in Composite by 'diffusion polymerisation'. These materials are now light sensitive so protect from light. Etch the teeth with phosphoric acid. Place Prelude #2 Adhesive on the teeth and then the veneers on the adhesive. Light cure as usual.

Conclusion

Clinical efficiency results from use of the described veneering procedures. The veneers done described are as strong as natural teeth¹. Unlike crowns, veneers can be colour corrected easily at the bonding appointment, easily matching even a single central incisor. The result routinely exceeds the usual aesthetic improvement made with crowns, more efficiently and without severe tooth reduction required for crowns. ■

References

- There is a current version of the complete veneer bonding procedure on: <http://adhesion.com/newsltr.html>
 General reference: Calamia JR (1983). Etched porcelain facial veneers, *NY Journal of Dentistry* 53:255-259
- Magne P and Douglas W (2000). Cumulative effects of successive restorative procedures on anterior crown flexure: intact vs. veneered incisors, *Quint Int* 31:5-18
 - Castelnuevo et al (2000). Fracture load and mode of failure of ceramic veneers with different preparations, *J Pros Dent* 83:171-180



Raymond L. Bertolotti received his DDS degree from the University of California, San Francisco, after working as a PhD metallurgical and ceramic engineer at Sandia National Laboratories. He is currently clinical professor in Biomaterials Science at the University of California and conducts a private practice in San Leandro. Much of his private work is involved with conservative crown and

bridge techniques and adhesion dentistry.

You can contact Dr Bertolotti by email at rbertolott@aol.com or visit the website at www.adhesion.com