2016 *CDA Presents* in Anaheim

Conservative Concepts for Esthetic Success: Bleaching, Veneers or What?

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Handout
Etched Porcelain Veneers & Bleaching

By
Harald O. Heymann, DDS MEd

Tooth Preparation

Important! The ultimate key to long-term success with etched porcelain veneers is to use **an intra-enamel preparation**. Research shows that bonds to enamel are far more predictable and durable than those to dentin.(Meiers JC and Young D. Two-year composite/dentin durability. Amer *J Dent* 2001*;* 14(3): 141-144 and Friedman MJ. A 15-year review of porcelain veneer failure: a clinician's observation. *Compend Cont Ed Dent* 1998; 19:625-636.).

Preparation Design*:*

* Facial reduction is approximately 0.5-0.75 mm mid-facially, terminating at the gingival margin with a heavy chamfer and a reduction depth of 0.3-0.5mm (Figure 1). Incisal reduction is typically 1.0-1.5 mm.
* Facial reduction is best achieved using a series of three horizontal "hemi-preps" so that reduction depths can be seen in cross-section.
* An incisal lapping preparation is the strongest design (see Figure 1 below), but a simple butt joint with no lapping is the easiest design to prepare.

Figure 1

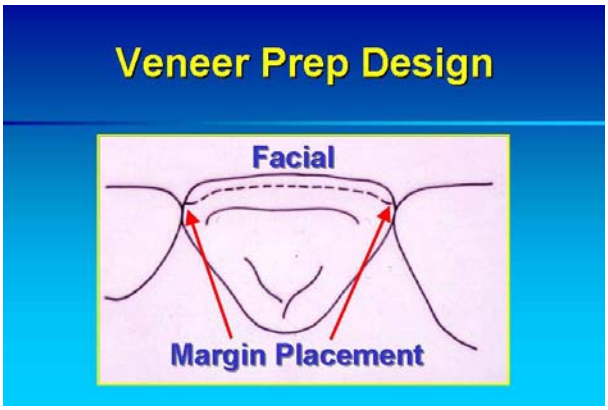

Figure 2

* If interproximal tooth contact is present, the margins of the preparation are positioned just facial to the contact area to maintain an optimal contact relationship (Figure 2).
* Interproximal contacts are not stripped or eliminated with this preparation design.
* Gingival margins are maintained at the level of the crest of the gingival tissue if the discoloration or defects extend into the gingival one-third of the tooth. If the gingival one-third is free from defects, the gingival margin can be placed supra-gingival for optimal tissue health.

Impression

* If gingival embrasures are wide open, block them out from the lingual to prevent interlocking of the impression material facio-lingually and tearing of the impression.
* Leave small diameter retraction cords in place. Carefully remove from impression if they are attached.

Temporization

* If a pre-operative diagnostic wax-up is made, temporaries must be generated based on this wax-up in order to verify the anticipated final veneer contours, speech, and esthetics. On occasion, if no wax-up is indicated, no temporaries are needed with intra-enamel preps.
* If temporaries are needed, they can best be made using a clear polyvinyl impression material (eg.Template Clear PVS from Clinician's Choice) for pre-op impression and a bis-acryl temporary material attached by spot etching small (~2mm diameter) facial area on each prepared tooth. Keep the clear impression until veneer delivery in case the patient breaks a temporary, and requires a repair.
* Caution patient to avoid biting with the veneer temporaries. These temps are for looks, not function!

Try-In and Cementation

* Try in veneers to assess marginal fit and relationship to one another mesially and distally. Minor adjustment to proximal margins can be made atraumatically with a coarse Soflex Disc (3M ESPE).
* To assess shade, try in a central incisor veneer. Try-in pastes are available, but I prefer water or a water-based gel to best assess esthetics of the veneers. Select value of veneer cement based on try-in. I use the translucent shade of veneer cement (virtually clear) 95% of the time unless significant staining of tooth exists. Opaque cements containing titanium dioxide can kill "esthetic vitality," so be careful in using them. In my opinion, any masking qualities should be incorporated in the veneer itself for best results.
* After try-in, dry veneer thoroughly before proceeding with bonding. Apply silane to tooth side of clean, uncontaminated veneer.
* Turn down operatory light prior to bonding the veneers to prevent inadvertent premature curing of the resin bonding components. Bond the two central incisor veneers first. Apply resin bonding agent to etched veneer and etched enamel surfaces, and load veneer with uniform thickness of veneer bonding cement. Seat veneer prior to light curing any of the resin components. Use a light-cured resin cement, not a dual-cured resin cement to avoid future potential discoloration from tertiary amines. Light-cured resin cements are far more color-stable over time.

Finishing and Polishing

* Use a #12 blade (not 12-B!) in a Bard-Parker surgical handle to remove most of the marginal excess of cured cement. Be careful! Be sure to use a good finger rest and controlled strokes!
* Using a very fine diamond instrument (flame for facial, oval for lingual), "dress" any marginal areas of the veneer where overhangs, bulbous areas or rough spots exist. Margins should be smooth and confluent with surrounding tooth contours. Adjust the occlusion with an oval diamond instrument.
* Use a 30-fluted carbide finishing bur to smooth any areas dressed with the diamond to plane the porcelain surfaces and to remove any residual striations produced by the diamond.
* Use porcelain polishing cups and points (eg. Dialite system from Brasseler USA) to polish any areas that have been adjusted.
* Caution: patient must avoid hard foods or objects to prevent chipping of veneers. A processed acrylic biteguard is often recommended as well to help protect veneers.

Handout
Vital Tooth Bleaching
By
Harald O. Heymann, DDS MEd

What bleaching technique works best?
The end results for virtually all bleaching procedures can be the same, because the mechanism of action is the same: oxidation of organic pigments in the tooth.

However, some techniques may be more expeditious than others, because bleaching is time and concentration dependent.

What types of whitening treatments exist?

-Whitening toothpastes

-Over-the-counter products

-In-office systems

-Tray bleaching approaches (including Nightguard Vital Bleaching or NGVB)

Whitening Toothpastes

Whitening tooth pastes can improve esthetic results about 2-3 shades (based on UNC clinical trials) when measured with a classic Vita shade guide. However, most whitening with these toothpastes is the result of removal of extrinsic stains through the abrasive action of ingredients such as pyrophosphates (eg. pumice), not through any significant oxidation of organic pigments.

Over-the Counter Tooth Whitening Products

OTC products such as Crest Whitestrips and Aquafresh Whitening Trays are available for consumer tooth whitening in varying concentrations usually of HP. Aquafresh Whitening Trays use convenient pre-loaded trays to facilitate whitening.

Crest Whitestrips utilize a unique “controlled dose delivery system” to facilitate significant whitening, but with reduced side effects, such as tissue irritation, owing to the low dosage administered. Numerous clinical trials have been conducted by Procter and Gamble to document the safety and efficacy of this approach.

With all OTC products, consumers should follow the manufacturers' instructions, and should not use these products beyond the recommended treatment time.

In-Office Tooth Whitening

In-office bleaching typically uses higher concentrations of HP and barrier techniques to protect soft tissues. A number of research proven methods are available to speed up in-office tooth whitening including:
-Incorporation of metal ion accelerants into the whitening formulation.
-Increasing the pH of the whitening material to facilitate dissociation of the hydrogen peroxide (Eg. Opalescence Extra Boost).
-Use of sufficiently high heat to potentiate the oxidation process.

Many different types of lights have been advocated for tooth whitening. But numerous credible research reports indicate that lights by and large do not result in clinically significant bleaching beyond what the bleach alone will achieve.

Sampling of Supporting References
-Papathanasiou A, et al. Clinical evaluation of a 35% hydrogen peroxide in-office whitening system. *Compend Contin Educ Dent* 2002; 23(4):335-346.
-Hein DK, et al. In-office vital tooth bleaching-what do lights add? *Compend Contin Educ Dent* 2003; 24:340-352.
-Kugel G, et al. Clinical evaluation of chemical and light-activated tooth whitening systems. *Compend Contin Educ Dent* 2006; 27:54-62.
-Marson FC, et al. Clinical evaluation of in-office dental bleaching treatments with and without the use of light-activation sources. *Oper Dent* 2008; 33(1):15-22.
-Kossatz S, et al. Effect of light activation on tooth sensitivity after in-office bleaching. *Oper Dent* 2011; 36(3):251-257.

Tray Bleaching Including Nightguard Vital Bleaching

Types of tray bleaching materials include"
-Hydrogen peroxide types
-Carbamide peroxide types

Hydrogen peroxide (HP) types of materials are generally administered for about 30 minutes during daytime applications due to their relatively higher concentrations.
Carbamide peroxide (CP) materials usually exhibit oxygen release for many hours, and are therefore administered for longer applications including NGVB applications. Concentrations for CP products are generally lower than those for HP materials.

Nightguard Vital Bleaching was introduced into the literature by Haywood and Heymann (*Quint Inter* 20:3) in 1989. It is still one of the safest, most effective means of tooth whitening. 10% CP is most frequently recommended, because excellent results can be obtained with minimal side effects. UNC Clinical trials revealed an average of 8 shades (Classic Vita Shade Guide) in 7 days with 10% CP administered with NGVB approach, although results vary significantly from patient to patient.

Side Effects of Tooth Whitening

Side effects include:
-Tooth sensitivity
-Tissue irritation

Tooth sensitivity is the result of a mild transient pulpitis induced by the peroxide ion. Many bleaching formulations currently include sodium fluoride and potassium nitrate to reduce sensitivity associated with bleaching.

Scalloping of bleaching trays is recommended to help reduce tissue irritation resulting from NGVB if concentrations are higher than 10% CP. Tissue irritation can be treated with oral antioxidants.

Clinical Considerations
The results of vital bleaching are largely unpredictable from patient to patient. No guarantees of efficacy should be given.

Vital tooth bleaching should be considered an esthetic treatment with a starting and ending point. Patients should strictly follow the manufacturer's instructions and treatment times. Vital bleaching products, especially those obtained OTC, should not be used on an ongoing daily basis like cosmetics such as make-up or skin cream. With all whitening products, extended long-term bleaching treatments beyond that recommended by the manufacturer is not recommended, unless it is done under the close supervision of a dentist.

Adverse Effects on Resin/Enamel Bond Strength

Resin bond strengths to recently bleached enamel can be reduced by almost 50%. Studies recommend that bonded restorations to recently bleached teeth be delayed at least 7-10 days post bleach to allow bond strengths to return to normal. (Machado JD, et al. *J Esthet Restor Dent* 2007; 19:111-119).

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DISCLOSURE
Dr. Heymann has no financial interest in any of the companies whose products are mentioned in this handout, but he is a past consultant for Procter and Gamble and Colgate, and has been a scientific advisor for Clinical Research Dental Co.

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