

Stain & Glaze



“CEREC ceramics can be exactly what you want them to be”
—James Klim DDS



Following tooth whitening process, molars are restored with Empress CAD Multi A2 ceramics. One-step stain and glaze brings the CEREC restorations to life.

Special points of interest:

- Stain and glaze with one oven firing.
- Following a systematic step protocol will allow the stain and glaze process to be completed in minimal time.
- Glazing will improve the physical properties of the CEREC ceramic.



CEREC Case Review—Stain & Glaze

One-Step CEREC Stain & Glaze (James Klim DDS)

“You can’t achieve aesthetics results with CEREC like a lab can”. This is the response I continue hearing from my aesthetic buddies. This use to be my line until becoming a CEREC convert two years ago. So what is it going to take to raise the bar for every CEREC restoration to mimic nature and equal or surpass a lab restoration?

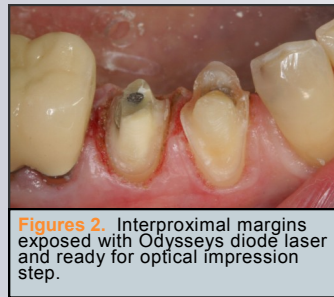
I would like to share my one-step stain/glaze technique that delivers excellent aesthetics and is fast, simple, and very predictable. Staining and glazing will not only bring your restorations to life; the process also improves the physical properties of the ceramic by mending the micro fractures developed during the milling process.

Mastering posterior aesthetics first starts with optimal preparation design, supra gingival margins where possible and



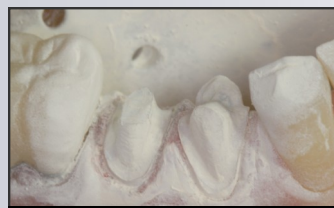
Figures 1. Prepared teeth maintaining supra gingival where possible.

controllable soft tissue management (**Figure 1**). I prefer to use the soft tissue laser for gingival troughing and recon-



Figures 2. Interproximal margins exposed with Odysseys diode laser and ready for optical impression step.

touring tissues where needed (**Figure 2**). This process is well accepted by the patient and an ideal way of exposing subgingival margins for optimal

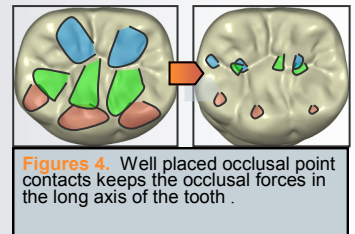


Figures 3. Two short spray discharge with IPS Contrast Spray leaves smooth preparations and well defined margins for optical capture.

optical impressions (**Figure 3**).

Before we get into the stain/glaze approach, a comment about occlusal design is imperative. One way to destroy aesthetics is wiping out the beautiful occlusal contours in order to fit the bite. Refining occlusion prior to preparation is important so the sequential events of CEREC records will fabricate a restoration that requires nothing more than slight spot occlusal adjusting at the most. Well placed occlusal

pits and grooves are present for food and cusps escaping channels. Functional occlusal design also aids in fine-tuning the restoration’s bite surface to point contacts and avoid broad surface contacts. This concept works exceptionally well for bonded ceramic biomechanics. When designed properly, well placed occlusal point contacts keeps the occlusal forces in the long axis of the tooth **Fig-**



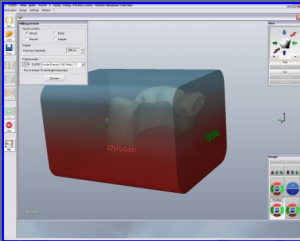
Figures 4. Well placed occlusal point contacts keeps the occlusal forces in the long axis of the tooth .

ure 4), bulked areas of the designed restoration and significantly decreases occlusal trauma on restoration and tooth.

The second step to achieving a natural appearing restoration is choosing the right ceramic block . With the new IPS Empress CAD blocks it has never been easier. There are more options based on the more familiar format of the A-D shade guide system. Each shade is available in high translucency (HT) or low translucency (LT) for each shaded block. The HT is 20% more translucent than LT. In addition to the main line shades, there are 4 bleach shades (BL1-BI-4)

**CADStar™ Main
Posterior Blocks**

Dr. Klim uses the Empress CAD Multi A1,A2 and B1 for the majority of his posterior inlay/onlay restorations. The block is matched by aligning to the cusp value and using the core body color for internal effects.

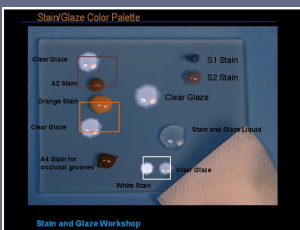


- **B1 Multi**—bleached valued teeth
- **A1 Multi**—lighter non-bleached teeth
- **A2 Multi**—average and darker teeth

CADStar™ Main Anterior Blocks Empress CAD 100 and the bleach CAD blocks BL1, BL2, BL3, and BL4

Color Palette

Premix 1 part stain to 3 part glaze A2, Orange and White. Other stains are A4 and/or Mahogany for pits and fissure, White, and Incisal Enamel 1 and 2. The color palette is stored in a moisture controlled environment to avoid the stains and glaze from drying out.



and Empress CAD Multi blended blocks that come in A1, A2, A3, A3,5 and B1.

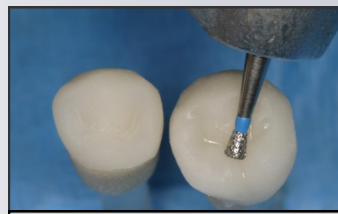
Choose the color and opacity of block by matching the value of the incisal or cusp portion of the tooth. Adding chroma/hue or lowering value can easily be done with the stain/glaze process. The cervical surfaces are



Figures 5. Custom dies with IPS Natural Die Material recreates stump color influence on ceramics

blended with stump color shine through (**Figure 5**) depending upon thickness and transparency of ceramic in the cervical zone. The ultimate blending process becomes very predictable when using the IPS Natural Die Material and final refinement of the body and cervical zones with stain/glaze.

To expedite the stain/glaze step, the primarily used stains are premixed with glaze and kept in a moisture controlled covered container and used throughout the week or till they are used up. Premixing facilitates a convenient characterizing with one oven firing. The IPS Universal Shades/Stain are available in Chromascop or A-D shades, along with additional stains for additional customization and special effects. The IPS Universal Shades/Stain system is easy to work with and made for faster firing.



Figures 6. Refine primary grooves and pits with inverted cone #35 diamond.

My stain/glaze protocol is started by refining occlusal grooves with 35 diamond bur (**Figure 6**). Clean restoration with micro-etch and steam. Hold ceramic for glazing with a custom formed IPS Natural Die Material stump or diamond hemostats for inlay/onlay.



Figures 7. Apply IPS Universal Glaze to all of ceramic avoid pooling in grooves and pits.

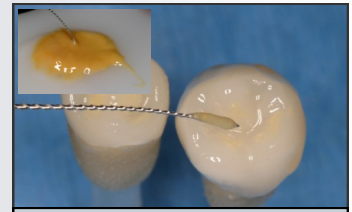
Place first layer of clear glaze (**Figure 7**), keeping thin on occlusal surface so as not to puddle in the grooves. Next apply desired cervical and body premixed stain/glaze (**Figure 8 & 9**) and carrying it



Figures 8 & 9. Apply mixed stain/glaze and blend cervical to stump shade. Extend cervical stain/glaze to interproximal contact zone.

into contact zone blending into stump shade. On anterior teeth carrying the cervical color interproximal will create a subtle windowing effect leading to greater depth and customization of the ceramic.

Characterizing the occlusal surface takes a few additional steps. Using a #10 endo file, orange premixed stain/glaze is lightly dropped at the base of the triangular ridges for a warming dentinal effect (**Figure 10**).



Figures 10. Mixed orange stain/glaze for occlusal dentinal effect. Apply a minimal amount of orange stain/glaze at base of triangular ridges with a #10 endo file.

Next take straight mahogany or A4 stain color and outline the occlusal pits (**Figure 11**) with a #10 endo file. With prior refinement of the primary grooves and pits, the stain will remain well defined. Don't overdo this step...we don't



Figures 11. Subtle highlight of developmental pits with mahogany IPS Style Stain using a #15 endo file.

want to create a tooth that has occlusal pathology and freak out our patients. Remove over characterized stain with dry brush if necessary.

The final stain/glazing step is application of premixed white stain/glaze to marginal ridges and coronal part of triangular ridge (**Figure 12**) with brush.



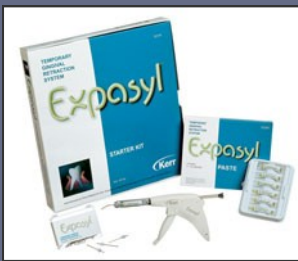
Figures 12. Highlight marginal ridges and coronal aspect of triangular ridges with white mixed stain/glaze.

With the approach described, characterizing stain/glaze can be performed in a routine step format and will take minimal time to accomplish (**Figure 13**).



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- The premier posterior isolating system
- Tongue and cheek isolation with suction, bite block and fiber optic illumination
- "I would have a hard time practicing without the isolite"—James Klim DDS



- Bleeding and crevicular seepage are controlled through the presence of aluminum chloride
- Leave in place over 5 minutes



Figures 13. One stain/glaze application for one furnace firing.

The main changes from case to case is blending the cervical and the intensity of the occlusal characteristics. It can easily be taught to team members (2-3 minutes for stain and glaze characterizing).

When the firing process is completed, the final ceramic finishing is accomplished with light polishing of margins with a yellow Axis polishing wheel



Figures 14. Finished aesthetic ceramics ready for etching and bonding.

and Diashine buffing of the glazed surfaces (Figure 14). Prior to etching the internal surface, check to make sure no glaze or debris is on the internal surface. Sand blast if

necessary and then etch for 60 second with IPS Ceramic Etching Gel. Place Monobond silane and you are ready to bond.

Proper isolation is mandatory for effective adhesive technique. I prefer the Isolite or rubber dam. It will also expedite the process. If there is risk of tissue seepage, Expasyl placed for 5 minutes or the diode laser will stop all cervicular fluid flow. **When bonding, we need to think with a microscopic mindset.** Approaching this part of the procedure with precision and predicable technique will virtually eliminate post treatment sensitivity assuming the restoration is not in traumatic occlusion or prior endodontic risks.

Multilink has added a new dimension to bonding adhesion. It is extremely simple to use by mixing A/B parts and applying to tooth for 20 seconds and then loading the resin on the ceramic with the automix tip. Seat, tack and clean excess resin in gel state while the internal material continues to auto cure. One word of advice, don't spot tack interproximal resin and clean interproximal contacts in the first 3 minutes. Otherwise you will first hand experience why this material has incredible immediate bond strength of 30+ MPa. It has become my standard for the posterior CEREC placement.



Figures 14. Completed CEREC ceramics.

I hope this caveat of stain/glaze characterizing has given you some insight and motivation to taking CEREC to the next level. It is one of the joys in my practice. With proper technique and systems, we can expedite predicable results every time.

| IPS Empress CAD with IPS Empress Esthetic Veneer – veneered | | | | | | | |
|--|----------------|----------|----------------|-----------------|--------------|----------------|-----------------|
| IPS Empress CAD with IPS Empress Esthetic Veneer Cut-back and veneered | B | S | t | T | H | V ₁ | V ₂ |
| Wash firing | 403°C 757°F | 4' 4' | 60°C 108°F | 840°C 1544°F | 2' 2' | 450°C 842°F | 839°C 1543°F |
| 1 st Incisal/Transpa firing | 403°C 757°F | 4' 4' | 60°C 108°F | 830°C 1526°F | 2' 2' | 450°C 842°F | 829°C 1525°F |
| 2 nd Incisal/Transpa firing | 403°C 757°F | 4' 4' | 60°C 108°F | 830°C 1526°F | 2' 2' | 450°C 842°F | 829°C 1525°F |
| Stain and Characterization firing | 403°C 757°F | 6' 6' | 100°C 180°F | 790°C 1454°F | 1' 1' | 450°C 842°F | 789°C 1453°F |
| Glaze firing | 403°C 757°F | 6' 6' | 100°C 180°F | 790°C 1454°F | 1-2' 1-2' | 450°C 842°F | 789°C 1453°F |
| Corrective firing IPS Empress Add-On 770°C/1418°F | 403°C 757°F | 4' 4' | 60°C 108°F | 770°C 1418°F | 2' 2' | 450°C 842°F | 769°C 1417°F |