



Matching Shade with Zirconia Accurately and Consistently: A Whip Mix eBook

By Al Fillastre, CDT



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Table of Contents

Zirconia Materials Types and Shading Schemes[3](#)

Shading Natural, Unshaded Zirconia; a Technique[4](#)

Preparation[5](#)

Posterior Crown Coloring Technique – Shade A2.....[6](#)

Anterior Crown Coloring Technique – Shade A2.....[9](#)

Bridge Coloring Technique – Shade A2[11](#)

The Whip Mix Family of Zirconia Discs[13](#)

About the Author

Al Fillastre, C.D.T.

Al began his training in dental technology shortly after receiving his B.S. degree in chemistry from Stetson University in 1975. He worked in a variety of commercial laboratories, and then returned to Lakeland in 1979 where he began working in his own laboratory alongside his father, Dr. Alvin J. Fillastre, D.D.S. Since that time, Al



has become an accomplished technician in all disciplines within the Crown & Bridge laboratory. He is extensively published presented numerous hands-on clinics and seminars in Occlusion, Ceramics, Composite Resins, Waxing & Metal Design, and many others. Al has lectured extensively to technicians and dentists alike on quality, excellence, communication, and technical skills. Al has also been recently involved with the development of the Denar 300 Series Articulator and presently owns and operates Ceram-O-Arts dental laboratory in Lakeland, Florida.

Today's zirconia materials are available in a variety of types and shading schemes

High strength, lower translucency zirconia, which is an ideal material to use in a posterior application due to its extremely high flexural strength (1,000MPa – 1,400MPa) and natural posterior tooth appearance. It may be milled as a substructure and veneered with porcelain or designed and milled as a full-contour, monolithic crown or bridge.

Lower strength with high translucency zirconia can perfect for a full contour anterior crown or short-span bridge (3-unit). It can simulate the translucency of lithium disilicate, but with a higher flexural strength (600-700MPa).

High strength, with high translucency zirconia might be the one zirconia material you use for almost everything. Its natural, vital esthetic appearance combines with very high flexural strength of up to 1100-1200MPa to make it ideal for most applications and positions within the mouth.

The Shading Schemes

Natural, Unshaded Zirconia

Each one of these varieties satisfies different clinical indications, but something that all 3 share are the shading systems. All offer a natural, unshaded form which requires dipping or painting a

special shading liquid onto the surface of a pre-sintered disc. In effect, this provides the technician with a "blank canvas", on which they can create the desirable natural color transition of the tooth from the cervical area through the incisal edge.

Pre-shaded Discs

Other options include pre-shaded discs which produce the chosen shade during the sintering process. They are generally mono-chromatic, requiring the technician to make adjustments for the lighter incisal section. Often this is accomplished by the user choosing a "lighter" shade (example: A2, instead of the prescribed A3), and staining the middle and cervical areas to an A3 base after sintering.

Multi-layered Discs

A third color strategy for puck shading design is the multi-layered disc. Each of the layers is shaded in an increasing or decreasing (depending on the perspective) level of chroma, or color saturation. The end result is, hopefully, a close facsimile of a natural tooth's color schema. There are instances when additional shading must be performed using shading pastes or stains, in order to closely simulate the natural tooth.

Shading Natural, Unshaded Zirconia; a Technique

A coloring solution is used prior to sintering to establish the restoration's base shade. The restoration may be dipped into the liquid colorant for the general shade or colorants may be strategically brushed onto the zirconia surface to achieve a gradient effect. Follow the colorant manufacturer's recommended technique.

There are many zirconia coloring products available, so it is imperative to use one that is compatible with the zirconia you are using.

The uncolored/unshaded discs need to be shaded using a liquid colorant applied before sintering. There are many coloring systems available, but no one solution looks the same on every zirconia. Each zirconia material yields its own specific appearance, based upon its rate of absorption, its density and its chemistry with the varied coloring agents.

Several commercially available coloring liquid systems can be used effectively with minor modifications. This illustrated technique is only one of several approaches you can use to accurately shade your zirconia restorations. It can be used for any level of laboratory production because of its simplicity, speed and excellent results.

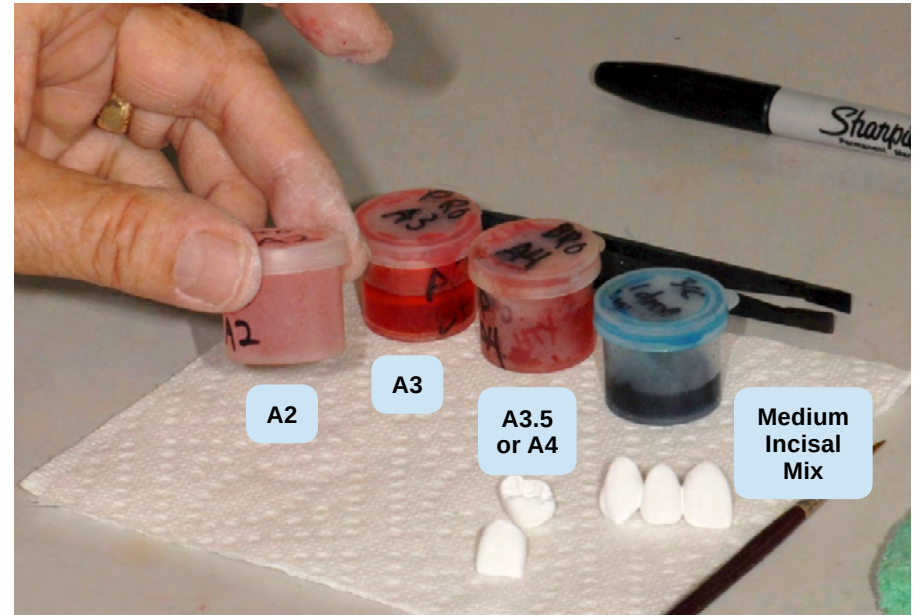


Preparation

Tip: Be sure to place the liquids in plastic airtight containers (screw lids preferable). Using an indelible marker, sandblast and mark the jar and lid with the identifying shade and any other pertinent information.

Tip: To distinguish each color on the crown/bridge, use a different color food coloring for each liquid.

Tip: Always clean and blot your brush and containers before changing to a different liquid. **IMPORTANT:** Do not let any metal touch the liquid (i.e., brush ferrule).



For an A2 shade, place the following liquids in the airtight containers:

- A2, used for primary crown chroma
- A3, applied to the cervical, interproximal and under pontics
- A3.5 or A4 for occlusal grooves and lingual fossae
- A Medium Incisal mix

Posterior Crown Coloring Technique – Shade A2



Apply one shade higher in chroma (in this case the A3 liquid) around the margin (cervical) area inside and outside of the crown.



Brush on the more chromatic shade to occlusal grooves and lingual fossae.



Apply the Base shade (A2) in a lateral segmental approach, up the middle of the cusps from cervical to incisal.



For the incisal area, a good incisal color can be reached by combining the following: (ratio) mix 3cc of the Origin Incisal Liquid 1.5 with 1 drop of Lava Plus Grey Effect Liquid.

Tip: For darker incisals (A3, A3.5, A4, B3, B4, etc), use 2 drops of grey incisal in 3cc Incisal Coloring Liquid.



Apply the liquid only to the occlusal ridges.



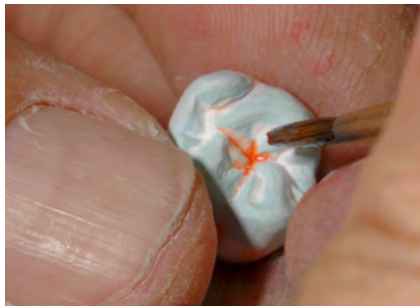
Apply the incisal liquid on the outer surfaces of the crown, but skip over the previously applied shade segments. You can also apply a second coat in the same places if you want more translucency.



Apply a second coat of incisal to all occlusal ridges, but this time cover the lateral segmental stripes on the outer surfaces. Don't make the line even. Stagger the length of the incisal coverage to make it more natural.



This is an opportunity to break up the light even more by adding a darker or lighter incisal liquid on cusp tips, all ridges, marginal ridges or wherever extra translucency might add more realism.



To create depth and realism, add darker liquid colorants (generally one or two shades darker than the base shade) to pits, fissures, secondary grooves by dipping the brush tip only and allowing the liquid to flow into the un-colored areas left on the occlusal surface.

The colorants can be mixed with intensive modifiers for an even more dramatic effect if desired. Adding these colors to create realism takes less than 30 seconds.

Tip: Do not let the crown dry out. If you have to leave your zirconia in the middle of coloring for more than a few minutes, it is recommended that you re-moisten the areas you colored, using distilled water.



Use a plastic tweezer to hold the crown and fully immerse it for only 5 seconds. Additional time is un-necessary and may cause shading problems in thicker areas, especially bridge pontics.



Using canned air, blow dry the coloring agent.



The crown is ready for sintering.



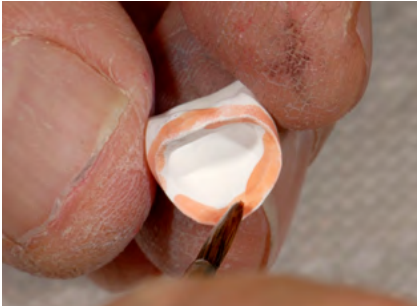
Sinter at 1500°C and follow [Vericore Zirconia Sintering instructions](#).



Final Results

Polished final result with natural esthetics.

Anterior Crown Coloring Technique – Shade A2



Apply one shade higher in chroma (in this case the A3 liquid) around the margin (cervical) area inside and outside of the crown.



Apply the incisal but avoid applying over the lateral segmental coloring on the first coat.



Apply one shade higher in chroma (in this case the A3 liquid) to the lingual fossa area.



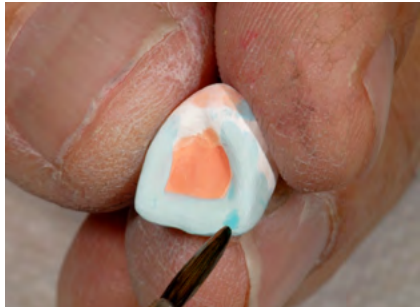
Apply incisal coloring to marginal ridges and the lingual. Do not apply over the colored lingual fossa.



Apply the Base shade (A2) to the between the developmental lobes. Lateral segmental technique pictured.



Apply a second coat of incisal, but this time cover the lateral segmental stripes. Don't make the line even. Stagger the length of the incisal coverage to make it more natural.



Apply a second coat of incisal.



Use a plastic tweezer to hold the crown and fully immerse it for only 5 seconds. Additional time is not necessary and may cause shading problems in thicker areas.



Using canned air, blow dry the coloring agent.



Sinter at 1500°C and follow [Vericore Zirconia Sintering instructions](#).



Final result -

Zirconia may be polished with flour pumice and a rag wheel or traditionally glazed, as desired.

Bridge Coloring Technique – Shade A2



Using a shade that is higher in chroma than the base shade, apply **VERY LIBERALLY** to the tissue side of the pontic...
3 OR 4 COATS!



Add the high chroma colorant to the inside of the margins also...



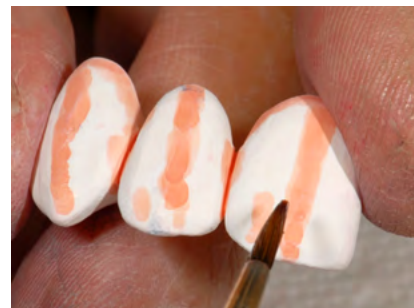
Apply the same high chroma colorant to the facial and lingual embrasures.



...and to the underside of the pontic.



Continue to apply the high chroma colorant around the margins.



Using the regular body shade, place stripes in a lateral segmental arrangement



Next, apply the incisal, but do not cover the area that you already applied the lateral segmental color.



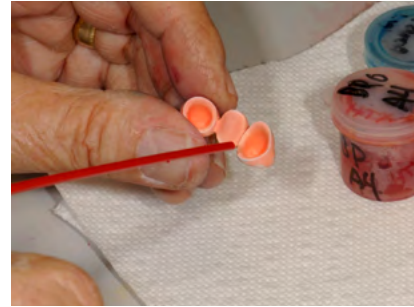
Next, apply incisal coloring to marginal ridges and the lingual incisal area. Do not apply over the colored lingual fossa.



Now, apply a second coat of incisal covering the lateral segmental stripes (where appropriate for incisal).



Use a plastic tweezer to hold the bridge and fully immerse it for only 5 seconds. Additional time may cause shading problems, especially in bridge pontic areas.



Using canned air, blow dry the coloring agent.



Ready for Sintering!



Sinter at 1500°C and follow [Vericore Zirconia Sintering instructions](#).



Zirconia bridge hand polished using pumice and a rag wheel.

The Whip Mix Family of Zirconia Discs



Vericore ZR HT is Whip Mix's high strength, lower translucency zirconia, which is an ideal material to use in a posterior application due to its extremely high flexural strength (1,000MPa – 1,400MPa) and natural posterior tooth appearance. It may be milled as a substructure and veneered with porcelain or designed and milled as a full-contour, monolithic crown or bridge.



Vericore ZR HTX is Whip Mix's lower strength, high translucency zirconia which can be perfect for a full contour anterior crown or short-span bridge (3-unit). It can simulate the translucency of lithium disilicate, but with a higher flexural strength (600-700MPa).



Vericore ZR Pro is Whip Mix's popular high strength, high translucency zirconia which is the one zirconia material you can use for almost everything. Its natural, vital esthetic appearance combines with very high flexural strength of up to 1100-1200MPa to make it ideal for most applications and positions within the mouth.

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