3M Science. Applied to Life.™

3M℠ Health Care Academy

Lifelike Shading Technology: More than what meets the eye.

Lava™ Plus High Translucency Zirconia

More than what meets the eye.

A great restoration ultimately needs to look natural to the patient—and with today's all-ceramic options, it's easier than ever to achieve lifelike esthetics. Labs can create a monolithic zirconia restoration that looks like the real thing through characterization with dyeing liquids prior to the final heating or sintering step.

But the truth is, not all materials and shading systems are created equal. With a rich history of finding unique solutions to complex problems, 3M dug deep into its expertise in optics, color science and ceramic technology to create a solution unlike others—Lava™ Plus High Translucency Zirconia matched with Lava™ Plus High Translucency Zirconia Dyeing Liquids. The patented process combines a unique zirconia ceramic material tailored for both monolithic and porcelain veneered restorations with custom formulated dyeing liquids that enable the lab technician to combine science and art to create truly remarkable replacements for natural dentition.

How does good science equal great color?

The appearance of a restoration relies on how your eye perceives the light that interacts with it, whether the light is reflected off the surface (reflection), interacting inside (absorption, fluorescence and opalescence) or passing through (transparency).

All three come into play when comparing a finished restoration to a shade guide or surrounding dentition. How a material harnesses the behavior of light helps ensure an accurate shade match.

Lava Plus zirconia restorations are made up of tiny zirconia crystals with an average size of approximately 0.5 µm. To give you a little perspective, the diameter of a human hair is 100 µm! The crystals become tightly packed during the final sintering process, transitioning into a dense zirconia ceramic that contains a minimum of structural defects like pores, heterogeneities and contaminates (Figure 1). This reduces potential light scattering centers while also enabling the finished material to meet the highest strength classification as specified by ADA 69/ISO 6872. The result is a material that interacts with light beautifully, yet is extremely strong and can be used for multi-unit long span anterior and posterior bridges.

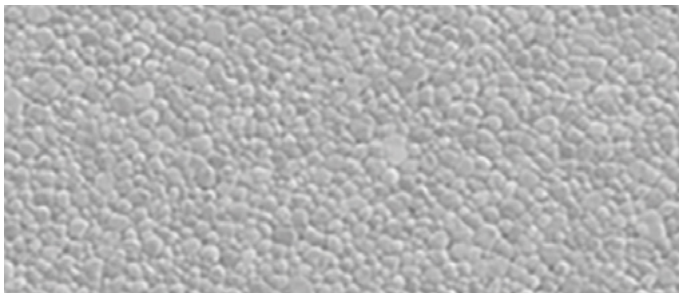

Fig. 1: The uniform crystal structure of Lava™ Plus High Translucency Zirconia.

To get the warm, translucent appearance of natural dentition, Lava™ Plus High Translucency Dyeing Liquids and Enamel Shades are applied to the pre-sintered restoration after the milling step. Because of their advanced chemical makeup, the color ions in the Dyeing Liquids actually become incorporated directly into the zirconia crystals during the sintering process. The liquids contain a finely tuned mixture of soluble gray, pink or yellow color ions in perfect proportions needed to achieve the desired VITA® classical shades. Special Enamel Liquids have also been developed to further enhance the occlusal surface, and Special Effects Shades are available for additional customization. By applying multiple layers, the concentration of ions can be adjusted to change the saturation of the color from darker at the cervical to lighter at the occlusal—enabling natural gradient shading (Figure 2). When sintered, the ions become a part of the chemical makeup of the zirconia crystals, not simply a coating on the material.

Fig. 2: An unsintered Lava™ Plus High Translucency Zirconia restoration with Lava™ Plus High Translucency Dyeing Liquids applied (left). The final restoration (right).

The unique technology used in the Lava Plus zirconia Dyeing Liquids helps preserve the translucency after shading without compromising strength, because the color ions become part of the crystalline structure. When light enters, it interacts with the color ions, resulting in a warm, natural intrinsic shade coming from "inside" the depth of the restoration (Figure 3). If the coloration were simply "stained and glazed" on the outside, it could wear down over time and lose the properties that create great-looking restorations.

Fig. 3: The optical properties of Lava™ Plus High Translucency Zirconia.

Not only does Lava Plus zirconia match a tooth's color almost perfectly, it also mimics its natural fluorescence. With the Lava Plus zirconia Fluorescent effect shade, a restoration will emit a glow from within—further matching the optical properties of a tooth. The incorporation of fluorescent ions in combination with color ion shading creates a restoration that is almost undetectable.

What does this mean?

With the advanced properties of the Lava Plus zirconia material and the chemical makeup of the Lava Plus zirconia Dyeing Liquids, labs can create restorations that are almost unidentifiable from the surrounding dentition. The dyeing liquids are engineered to integrate perfectly with the Lava Plus zirconia crystal structure to produce a high-strength material that has consistent shade match, time after time. It's color ion technology applied to great-looking restorations.

www.3M.com/LavaPlus

3M Oral Care
2510 Conway Avenue
St. Paul, MN 55144-1000 USA

Phone 1-800-634-2249
Web 3M.com/dental

3M Canada
Post Office Box 5757
London, Ontario N6A 4T1
Canada

Phone 1-888-363-3685