

The New Esthetic Colorant:

A true enhancement characterization of zirconia restoration

By Sean Park

Abstract

Multi layered zirconia has emerged as a popular choice for All-Ceramics material in contemporary dentistry because of its durability and strength in dental restorations. However, achieving natural translucency and characterization can be a daunting task. To overcome this obstacle, zirconia coloring liquids have been developed to enhance the material's esthetics before sintering. In this article, we will delve into the production process of a single central matching implant case using KATANA zirconia, which was also paired with a new Esthetic Colorant zirconia coloring system. The article will cover various topics such as minimal facial cut-back, and layering techniques, as well as the utilization of eLab software to achieve optimal results.

Introduction

Single central matching in esthetic dentistry remains a challenging procedure despite advancements in dental materials. Facial cut-back and layering techniques can help achieve a natural-looking match, but traditional external stain techniques with zirconia have limitations in creating translucency and characterization. Proper characterization of zirconia, such as green stage coloring or internal staining technique, can overcome these limitations. Furthermore, the advent of digital dentistry and eLab software has revolutionized the workflow of achieving a seamless match. This article discusses the benefits of proper characterization of zirconia and the integration of eLab software in achieving a natural-looking single central match.



Figure 1

Application of Esthetic Colorant applied on green stage zirconia crown. In this case, the yellow area of the zirconia crown was applied with B+, while the pink area was applied with Grey. Additionally, the blue area was applied with Blue colorant.

Figure 2

To evaluate the effectiveness of Esthetic Colorant, a comparison was conducted between two crowns with the same YML NW shade of KATANA Disc. One of the crowns was enhanced with Esthetic Colorant, while the other remained in its pure shade of YML zirconia disc. By comparing the two crowns side by side, any differences in color, and translucency between the two restorations could be observed and evaluated.



Case Report

The patient visited the dental clinic due to a loose implant crown. It was discovered that the patient had received a full zirconia abutment and zirconia crown, which was cement-retained and delivered in 2008. Upon careful observation, a fracture was discovered on the neck of the zirconia abutment. Further investigation revealed that the abutment had weakened over time, causing the fracture.

To fabricate the implant abutment, a custom modification of the stock abutment was done instead of using a titanium base, as the implant was deeply placed. The implant crown was designed on Exocad software, using a minimal facial cut-back design that fully supported the lingual or incisal aspect. A Noritake KATANA YML NW shade disc was chosen to achieve a 1M1 value, which is the most important factor when matching shades. However, even if the value is selected for the zirconia disc, the hue and chroma may not always be accurate. To address this issue, zirconia coloring liquids like Noritake Esthetic Colorant can be used to enhance the chroma, translucency, and characterization during the green stage. This Esthetic Colorant system is specially formulated for the KATANA Zirconia Multi Layered series, and its water-based liquids do not contain acids that could harm the flexural strength of the zirconia substructure. To enhance the yellowish hue chroma on the cervical, a single pass of B+ liquid was applied. For body and incisal translucency, a single pass of grey liquid was used, and on the incisal edge, two passes of blue liquid were applied to enhance the bluish translucency (**Fig. 1**). The sintering process of a zirconia crown is critical to achieving the desired color enhancement. For a regular seven-hour sintering schedule, it is crucial to hold the crown at 80-200°C/176-392°F for at least 30 minutes to prevent the applied color from burning out. In this study, two YML NW shade crowns were compared after sintering, with one crown applied with Esthetic Colorant and the other without.

The enhanced effect of the Esthetic Colorant was found to be soft and gentle, making it easy to apply multiple passes if needed (**Fig. 2**). To match the shade accurately, the sintered crown was digitally tried-in with eLab software, which utilizes a unique grey card and polarized images. With LAB



Figure 3
After using Noritake CZR internal stain to adjust the color and performing a digital try-in with eLab software.

Figure 4
Final fabricated implant crown



Figure 5
The final implant crown after cementation with the abutment



Figure 6
An image showing well-conditioned implant tissue after removal of the PMMA



color calculation, the software can obtain references to match the color precisely. Moreover, digital try-in with polarized images aids in visual shade matching. After the initial digital try-in, the crown exhibited a slightly yellowish hue and more intense chroma. To correct the shade, Noritake CZR Internal Stain was applied, (Fig. 3) and the internal stained area was chosen as the stump shade using eLab software. The software then generated more accurately the porcelain recipe with Noritake CZR. Following eLab's recommended recipe, one build-up technique was employed using CZR Body and Luster powder, with digital try-in at each stage. During glazing, the layered facial area was naturally glazed, and Noritake CZR FC Paste Stain was used for the remaining areas (Fig. 4). The zirconia crown and abutment were cemented with Kuraray PANA VIA V5, and the fabrication was completed (Fig. 5). The temporary implant PMMA was removed before delivery (Fig. 6), and the final delivered implant crown was placed (Fig. 7). The patient's lower third smiles were then captured during a follow-up visit three weeks later (Figs. 8-10).

Figure 7
Immediate post-operative intraoral image of final delivered implant crown #8



Figures 8-10
The patient's lower third smile images



Summary

The application of Esthetic Colorant coloring liquids has greatly enhanced the translucency and characterization of zirconia, leading to the production of more natural-looking dental restorations. This system offers gentle and user-friendly features, allowing for multiple passes if required, resulting in an even greater enhancement of zirconia restorations. As digital dentistry and eLab software are introduced, proper characterization of zirconia has become more critical than ever. These state-of-the-art tools have transformed the workflow for achieving a single central match that flawlessly integrates with the patient's natural dentition, rendering shade matching easier than ever before. ■

About the Author:

Sean Park is a master dental ceramist who pursued his studies at UCLA Center for Esthetics, mentored by Dr. Edward McLaren. Presently, he is associated with Goldstein Garber & Salama in Atlanta, Georgia, and is an integral member of Team Atlanta 2.0. Apart from that, he serves as an International Instructor for Kuraray Noritake and a KOL for Hass Bios, Medit, and Exocad. With his expertise in ceramics and esthetic dentistry, Park has contributed extensively to the field by publishing several papers and delivering several lectures.



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