

The Benefit of Low-Fusing Veneer

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Today, dental professions are conflicted as to which materials achieve the best esthetic results for cosmetic restorations. When selecting a material, each case should be looked at individually. There are many factors to consider, including underlying tooth color after preparation (stump shade), preparation design, and the patient's medical history (eg, any allergies or a history of bruxism).

After preparation, if the underlying tooth color is dark, between shades A5 and C10, the substructure should be built up with a highly opaque material, such as zirconium or opaque pressable materials. These mask underlying color. If the underlying tooth color falls between the Vita Classic shades of A1 and D4, alumina or porcelain veneers can be used successfully. However, an advanced technician can still mask underlying tooth color by utilizing porcelain veneers in combination with detailed color-masking techniques.

Preparation design factors also influence material choice, particularly when trying to achieve the right amount of reduction. For the margin preparation, a shoulder or deep chamfer is recommended for the best esthetics. The preparation design for anterior dentition should have a labial reduction between 1 and 1.2 mm, an incisal reduction between 1.5 and 2 mm, and a lingual reduction of 1 mm to achieve esthetic results.

In addressing the patient's concern over esthetics, biggest issue for the clinician and dental technician can be choosing materials.

CASE PRESENTATION

A 36-year-old male patient presented with two existing porcelain-fused-to-metal (PFM) crowns on the maxillary central incisors, a composite buildup on the maxillary left lateral incisor, and a chipped maxillary right lateral incisor (Fig 1). The patient was unhappy with his anterior dentition and wanted to replace these teeth with esthetic restorations. The patient's gum line also needed to be addressed, raising the tissue height of both central incisors (Figs 2 to 4). The patient had options for different restorations. The PFM crowns could be replaced with all-ceramic restorations. Porcelain veneers were chosen instead of crowning the lateral incisors.

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CASE PRESENTATION



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Fig 1 Wax coping ready for investment.

Fig 2 Mesial concavity on right lateral incisor. Veneer must be contoured normally for tissue support.

Fig 3 Recommended crown lengthening.

Fig 4 Postoperative view of gum line.



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Each restorative system or product has its limitations in esthetics, function, and long-term success, which can make a combination case difficult. Some manufacturers recommend using only one porcelain, but today dental professionals also have access to products designed for different applications. Using specialized porcelains for specific applications can achieve the maximum or highest esthetics. The GC Initial porcelain system that was chosen for this case has five different porcelain powder systems and a pressed ceramic ingot system. Choosing between the five different powders depends on the framework or substructure that is in place. Initial MC is for PFM restorations and veneers. Initial LF is low-fusing porcelain, which can be used for PFM restorations, on pressed ceramic ingots, and for porcelain veneers. The other three powders are Initial ZR for zirconium restorations, Initial AL for alumina restorations and Initial Ti for porcelain-titanium restorations.

As pressed ceramic crowns were chosen in combination with the cut-back technique and porcelain veneers, the Initial LF porcelain would be used.

An LSK treatment-plan waxup (Capital Dental Technology Laboratory) was prepared. The clinician reviewed the treatment plan and anticipated results with the patient, using the natural-looking waxup as a visual aid. A waxup can be a powerful visual tool that can help a patient understand and accept a treatment plan. In most cases, the LSK treatment-plan waxup is delivered with a preparation guide model and/or a vacuum stent. The stent can be used as an in-mouth preparation guide and to produce provisional restorations (Fig 5). Provisionals produced using the stent allow patients to "test drive" restorations to evaluate the shape and function in their mouths and clinicians can photograph their smile with the provisional in place. If needed, adjustments can be made to the provisional restorations (Fig 6).

Fig 5 Intraoral view of provisional restoration.

Fig 6 Provisional restoration needing adjustment of incisal length.

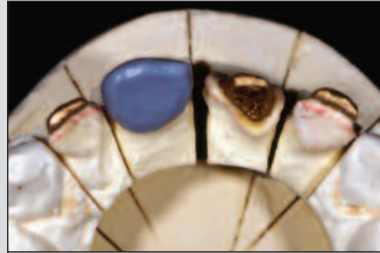
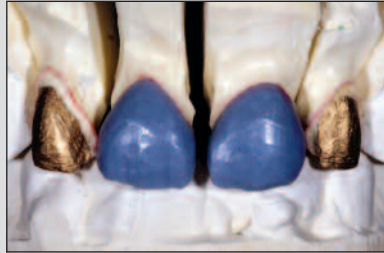


Fig 7 Full contour waxup for pressable crowns

Fig 8 Facial buildup of the full contour waxup to compensate for extra facial room of the central incisors and to ensure alignment with the lateral incisors.

Fig 9 Wax coping ready for investment.

Fig 10 Numerous ceramic ingots, ranging from opaque to transparent.



The central incisors were waxed to full contour and cut back for the incisal edge (Fig 7). To compensate for extra facial room of the central incisors and to ensure alignment with the lateral incisors, the waxup was built up more facially (Fig 8). The waxup was then sprued and prepared to press (Fig 9).

Ceramic ingot selection was also very important (Fig 10); using different manufacturer's ceramic ingots provides a wider assortment of colors. In choosing a ceramic ingot, a clinician must take into consideration whether it is for a single restoration or a combination case, how much tooth reduction is required, and the stump shade or internal colors of the preparation. Also, the greater the tooth reduction, the thicker the

pressed crown will have to be. Knowing, however, that the translucence of pressed ceramic ingots at different thicknesses will affect the crown color the GC Initial PC was chosen. This system offers a wide variety of pellet colors in 16 dentin shades, 4 bleached shades, 3 veneer shades, 4 occlusal enamel light shades, 4 occlusal enamel milky shades, 4 translucent shades, and 5 opaque ceramic ingots. The opaque ceramic ingots are valuable when dealing with discolored preparations, as the opacity is at 85%. The colors are light yellow, pale yellow, red yellow, olive, and white. As pressed ceramics can sometimes get too translucent, a wide range of choice is preferred. The opacity level of the Initial PC ingots ranges from 30% to 85%.

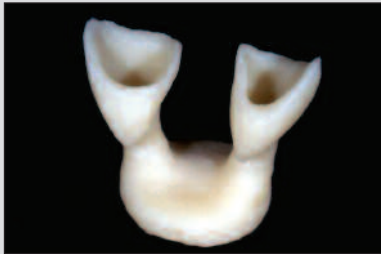


Fig 11 Pressable ceramic crown after divesting.



Fig 12 Occlusal view showing facial room and alignment for fabricating color restorations between porcelain veneers on the lateral incisors and pressable crowns on the central incisors.



Fig 13 First application of internal staining for greater color saturation of pressable copings.



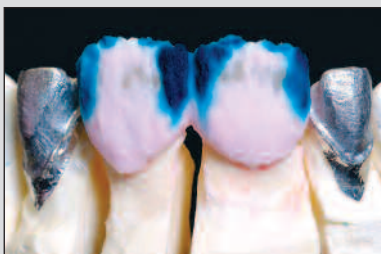
Fig 14 Buildup of Natural Dentin.



Fig 15 Trimming of Natural Dentin for mamelon effect.



Fig 16 Application of Enamel Occlusion porcelain.



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Fig 17 Application of Enamel Opal porcelain.

Fig 18 Application of fluorescent opacious dentin to create underlying background of mamelon effect.

After pressing (Fig 11), it was important not to apply too much heat while cutting off the sprues or performing other modifications. Once the cut-back framework was ready for porcelain application, the thickness and available room for layering porcelain were checked (Fig 12). The shade of the framework was also checked to see if any modifications with internal stains were needed (Fig 13). GC Initial has INvivo, INsitu, and INover stains for application on the pressed ceramic material, both internally on the porcelain buildup and externally.

The dentin porcelain was built up over the entire pressed coping to give the crown optimal

chroma (Fig 14). The dentin porcelain was cut back to give room for the desired mamelon effect (Fig 15). The enamel porcelain and enamel opal porcelain were applied. The enamel porcelain (Fig 16) provides a shade gradation to the incisal edge similar to that of natural tooth. The enamel opal porcelain (Fig 17) has a higher level of opalescence as well as a high translucence. Flu Dentin, a newly developed high-fluorescence porcelain available in dentin colors, creates an underlying background of mamelon effect (Fig 18).

A thin layer of Clear Fluorescence powder (CLF) was applied between the dentin layer and

Fig 19 Application of CLF for natural depth in tooth color. [Au: Edit retain meaning?]

Fig 20 Application of translucence modifier.



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Fig 21 Application of white fluorescent transparent color to create whitish line of natural tooth dentition.



Fig 22 Application of Enamel Effective powder.



Fig 23 Application of Translucent Neutral.

Fig 24 Enamel application.

Fig 25 Full color saturation.

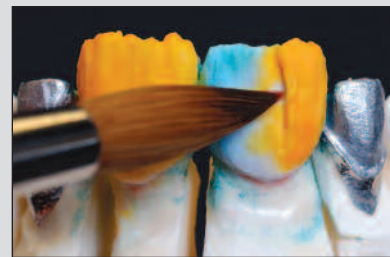
Fig 26 Creation of white craze line.

Fig 27 Touch-up of enamel application.

Fig 28 Completed enamel application.



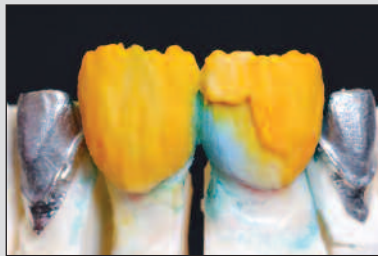
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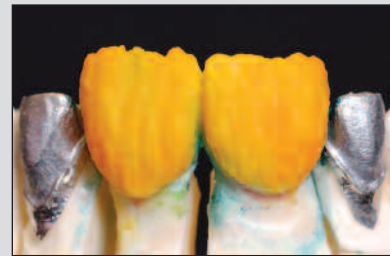
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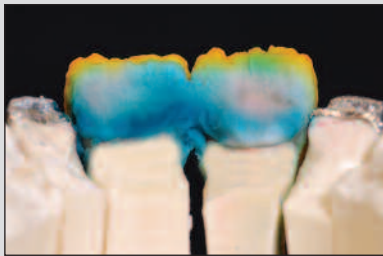


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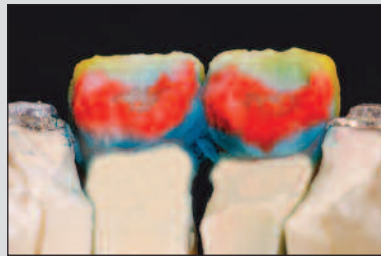
overlying enamels (Fig 19). This so-called sclerose dentin brings true-to-nature depth into the tooth color. Translucence modifiers were applied (Fig 20) over the CLF; they can be used individually or mixed with the Neutral or Opal Translucent.

To create the whitish line of natural tooth dentition, a Fluo Dentin was used (Fig 21). Enamel Effect powders were used at the area of the incisal

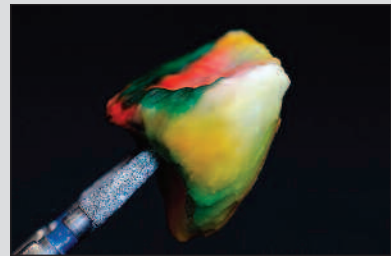
edge and helped give the natural appearance that cannot always be re-created with just one enamel shade (Fig 22) and an application of Translucent (Fig 23), the neutral color. The application of the enamel powder gave full color saturation (Figs 24 and 25). A white craze line was re-created (Fig 26), the enamel retouched up (Fig 27), and the enamel application completed (Fig 28).



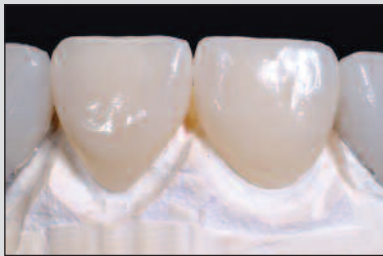
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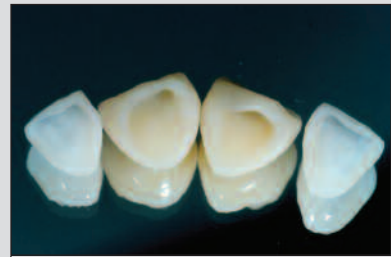
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Fig 29 Lingual buildup of dentin.

Fig 30 Occlusal buildup of enamel.

Fig 31 Buildup complete and ready to fire.

Fig 32 Completed restorations on solid cast.



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Fig 33 Lingual view of completed restorations.



Fig 34 Postoperative smile.



Fig 35 Postoperative smile showing left lateral incisor.



Fig 36 Postoperative view.



Fig 37 Postoperative facial view.

Dentin was applied to the lingual surface of the crown (Fig 29) and incisal enamel and occlusion was built up (Fig 30). The crown was taken off the model, and the buildup was completed on the contact areas (Fig 31). After the crowns were fired, any adjustments to complete the restoration were made on the solid cast (Fig 32).

This combination case involved two pressed ceramic crowns and two porcelain veneers (Fig 33). Using the same overlaying porcelain for each restoration gave the same results. Taking into consideration that the porcelain veneers did not have a substructure on the model and that once in the mouth color from the underlying tooth would show through, color adjustments were made with colored cements. The texture of the restorations (Fig 34) and segmentation were also taken into consideration. The result was a harmony of different restorations using different materials (Figs 35 to 37).

CONCLUSION

When selecting a material, longevity should be considered. If an esthetic restoration does not last, it is an inconvenience for both the patient and the clinician, not to mention the laboratory. Never forget the importance of function in all cases involving an anterior restoration. The ante-

rior dentition, for example, dictates posterior movements during mastication. Therefore, proper anterior occlusal function must be established for the patient's health and comfort, and for the longevity of the restorations.

It is inevitably a dental technician's responsibility to the clinician and the patient to be educated in the latest materials and techniques, in the proper function of occlusion and position of muscles to ensure esthetics, longevity, and comfort. A case involving a combination of restorations and materials can still achieve esthetic results, because regardless of the substructure, it is the overlaying porcelain, in combination with the skill of the ceramist, that decides the overall esthetics.

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