

Not All Smile Makeovers Are Limited to Television

Today's Popular Cosmetic Treatments

Abstract

Patient demand for more natural-looking restorations has created the need for a wider selection of restorative materials. New materials appear on the market every day, including a wide selection of all-ceramics. Treatment planning is important in the selection of an all-ceramic material and many dental professionals may find it difficult to find a dental laboratory that offers all-ceramic, high-end esthetic restorations. This article will show a case in which the dentist, with the help of an excellent laboratory partner, was able to perform a smile makeover for an appreciative patient.

Learning Objectives

After reading this article, the reader should be able to:

- list guidelines for material selection and options available.
- explain how the LSK 121 treatment plan wax-up is used for predictability and to show the patient what can be accomplished.
- identify how to use a clear stent made from a treatment plan wax-up for preparation guidelines.
- describe how full-color wax-ups can be used as a porcelain build-up guide.
- discuss how patient acceptance of the final restoration can be simplified by trying in the final restorations alongside the full-color wax-up.



Luke S. Kahng, CDT

*Master Ceramist/
Founder/Owner
LSK 121
A Division of Capital
Dental Technology
Laboratory, Inc
Naperville, Illinois
Phone: 630.955.1010
Email: luke@lsk121.com*



Asle T. Klemma, DDS

*Private Practice
Schaumburg, Illinois
Phone: 847.895.8565
Email: drklemma@aol.com*

Practicing cosmetic dentistry often means seeing patients who have been influenced by a culture of makeover television programs. Patient demand for more natural-looking restorations has created the need for a wider selection of restorative materials. As a result, the choice for cosmetic dentistry has never been greater. Dentists now see the need to become increasingly familiar with how these technologies can provide both function and beauty for patient restorations. Modern cosmetic dentistry has offered a variety of all-ceramic, or metal-free ceramic systems, allowing dentists to target a specific restorative material to a specific need Computer-aided design/computer-aided manufacturing. (CAD/CAM) technology is now a major contributor to these life-like restorations. Metal-free ceramic systems may not entirely replace porcelain-fused-to-metal (PFM) restorations, but these alternative systems can produce strong and vitally beautiful restorations to enhance patients' smiles.

When restoring a patient's smile, especially with the new all-ceramic systems, it is necessary to communicate with your dental laboratory. Finding a dental lab that offers extensive experience and training in highly cosmetic restorations is important. Partnering with this lab that has both knowledge of and access to all of the ceramic technologies available will allow you to comfortably choose the material best suited for your patients' needs.

“The presentation to the patient can be accomplished with good communication with the dental technician and is enhanced with the LSK 121 treatment plan wax-up.”

Case Study

History

A 42-year-old woman presented to the office seeking an evaluation for ways to improve her smile. Her family dentist had given her a few ideas for restorations, but the patient wanted to explore all of the cosmetic alternatives available. Her goal was a pleasant smile with no orthodontic treatment, in the shortest amount of time possible.

During the clinical examination, the following problems were noted (Figure 1): the cuspids were highly

blocked out of the arch and had no attached gingiva. Due to the dominant display of the cuspids, the first bicuspid appeared to be lingually displaced, which added to the dark appearance in the buccal corridor during her smile (Figure 2).

Diagnosis and Treatment Plan

The patient was diagnosed with a Class II, Division I dental occlusion. The highly blocked out cuspids with inadequate attached gingiva would be especially problematic to restore. After evaluating the study

models and photographs, it was determined that the dentist needed to restore teeth Nos. 5 through 12 to achieve the patient's goal of having a beautiful smile. To achieve this, the cuspid restoration needed to be placed much more lingually into the arch while adding buccal dimension to the first bicuspid. The laterals and centrals would be restored to a more proportionate relationship.

The presentation to the patient can be accomplished with good communication with the dental technician and is enhanced with the LSK 121 treatment plan wax-up.

Using the study model, the laboratory creates a laboratory preparation guide model (Figure 3). The dental technician will mark reduction



Figure 1—Preoperative view of maxillary teeth. Teeth Nos. 8 and 9 are old crowns. The margins are exposed and show irritation of the tissue. Due to the dominant display of the cuspids, the first bicuspid appeared to be lingually displaced.



Figure 2—Preoperative occlusal view.



Figure 3—Illustrated prep design facial reduction: tooth No. 9, 1.2 mm; No. 10, 1.5 mm; and No. 11, 2 mm. Lingual reduction: tooth No. 9, lingual, mesial, and distal 1.2 mm; No. 10, lingual 0.8 mm and lingual-distal 1.4 mm because of the rotation; and No. 11, lingual 1.0 mm.



Figure 4—LSK 121 treatment plan wax-up.



Figure 5—Clear stent made from duplicate model of LSK 121 treatment plan wax-ups.



Figure 6—Facial view of preparations.

Table—All-ceramic material preparation guidelines

System	Margin	Axial reduction mm	incisal reduction mm
Empress 1	shoulder internal rounded	1.0 - 1.5	2.0
Empress 2	shoulder internal rounded	1.0 - 1.5	2.0
Procera AllCeram	chamfer	0.8 - 1.5	1.5 - 2.0
Lava	shoulder internal rounded	1.0 - 1.5	2.0

guidelines on a duplicate model of the study models. The preparation guidelines for popular all-ceramics are shown in the Table.

After the technician completes the reduction of the teeth to be restored, the model is duplicated. This duplicated model incorporates all the proper preparation guidelines. The completed LSK 121 treatment

plan wax-up is a detailed, 3-dimensional, full-color wax-up (Figure 4).

The model with the LSK 121 treatment plan wax-up is duplicated and using that model, a clear stent is fabricated (Figure 5). The models are sent to the dentist and are used in the case presentation. The model with the laboratory tooth preparations serves as a guideline for the dentist

when preparing the teeth. The wax-up is used to show the patient what can be accomplished. This can be compared to the preoperative study model to explain the restorative possibilities.

The model with the clear stent has 2 possible applications: After the dentist completes the tooth preparations (Figure 6), the clear stent is used as a preparation guide (Figure 7). The laboratory preparation guide model also can be used as a guide, but the room available in the mouth cannot be seen by the dental technician. The clear stent also serves as a template, using a matrix for the provisional, and shows the patient a virtual blueprint of the finished restoration (Figure 8). The dentist can take



Figure 7—Clear stent used for checking clearance of preparation. The clear stent will also be used as a template for making the temporaries.



Figure 8—Functional protrusion view of temporaries.



Figure 9—Full colored individual wax-ups made to replicate diagnostic wax-up.



Figure 10—Full colored individual wax-ups using the putty matrix made from the study models of the temporaries. This is used to check the incisal length.



Figure 11—Occlusal view with full color individual wax-up and Lava copings, to check for room of porcelain.



Figure 12—Full color wax-ups are tried in and checked in mouth.

an impression of the temporaries and any modifications to the temporary will be seen by the dental technician.

The dental technician fabricates a putty index of the temporary using GC Lab Putty (GC America, Inc). To verify the contours of the final restoration, the LSK 121 treatment plan colored wax-up can be used. The color wax-up is a full-contour wax-up of the restorations (Figure 9). It is checked with the putty index for incisal length and can be used to determine if there is room for porcelain on the copings (Figures 10 and 11). The wax used is hard enough to withstand a try-in (Figure 12).

No single material is ideal for every case; each has advantages and disadvantages. The choice of material depends on factors unique to each

patient. Advanced technologies must be diagnosed for correct indications, and to narrow the choices, several questions must be asked.

- How will the patient's occlusion affect the material? If there is clenching or grinding, strength will be very important.
- The preparation guidelines, especially in some of the metal-free restorations, are strict. Does it require 1.0 mm to 1.5 mm of reduction? Is there enough tooth structure to provide this room? It is important to note if margins are subgingival or supragingival. Some materials, if they are supragingival, do not meet esthetic expectations. Does tooth structure allow for the 1.0 mm margin called for in many materials?

- Can the material adequately mask out any discoloration in the remaining tooth structure?
- Other considerations include biocompatibility, function, and long-term success. If the patient has allergies; material selection may be limited. No matter how esthetic the restorations are, without longevity in mind, they are not a success. Longevity is influenced by function and material selection.

Treatment

After evaluating all criteria for restorative materials, the dental team decided to use Lava (3M ESPE) because it has a metal-free sub-structure that uses zirconia. Zirconia's high flexural strength can be com-



Figure 13—Final porcelain application (GC Initial, GC America, Inc.) with multi-layers of porcelain powder build up.



Figure 14—Final check with full color wax-ups. Teeth Nos. 5, 7, 9, and 11 are wax-ups and Nos. 6, 8, 10, and 12 are Lava crowns.



Figure 15—Finished porcelain to Lava crowns.



Figure 16—Final contour try-in checked in mouth with full color wax-ups. Teeth Nos. 5, 7, 9, and 11 are wax-ups and Nos. 6, 8, 10, and 12 are Lava crowns.



Figure 17—Right lateral view.



Figure 18—Natural smile.

pared to that of PFM restorations. The translucency is very low and the opacity is high. Because the core material can be made in different colors, the esthetics allow the margins to be placed supra- or subgingivally. Based on my experience using the LAVA understructure at a thickness of 0.4 mm, this gives the same esthetic level as PFM restorations. In addition, these crowns can be thin without compromising strength, they mask tooth discoloration; and they include a choice of 8 different core colors.

Even with the limitations placed by the patient at the beginning of treatment, the Lava zirconia met all criteria for both restorative materials and cosmetic function, and the collaboration with the dental technician gave patient a beautiful smile.

Dental Technician Restoration Fabrication

The Lava zirconium oxide frameworks are fabricated by milling centers. This allows any dental lab the opportunity to offer dentists CAD/CAM fabricated Lava restorations without any major investment and the dentist is still able to collaborate with the laboratory that he or she is familiar with.

To create a natural looking build-up, 7 different Vita shades can be used with the framework. The porcelain build-up is completed with the LSK full-color treatment plan wax-ups, which allow the technician to do a multi-layering porcelain application (GC Initial, GC America, Inc.) (Figure 13). The build-up is contoured according to the wax-ups. After the first firing of the

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Lava restorations, they are checked with the full-color wax-ups. Next, the restorations are polished or glazed and checked against the wax-ups (Figure 14). When the finished Lava restorations are placed on the master model, the color and contour are beautifully matched.

The finished Lava restorations (Figure 15) are highly esthetic in combination with the veneering system. The framework wall thickness of 0.5 mm or 0.3 mm, which is due to the high strength of zirconia, supports the excellent translucency and provides ample opportunity for esthetic layering with the overlay porcelain.

Cementation

The try-in of the final restorations can be accomplished with the LSK 121 full-color wax-ups; every other tooth can be alternating wax-up and final restoration. (Figure 16).

All-ceramic restorations are frequently luted with adhesive bonding to enhance esthetics and increase the strength of the entire tooth restoration system. This no longer applies with Lava. This method of cementation will not result in any further increase in strength. The immediate view of the cemented restorations demonstrated good tissue response (Figure 17) and the patient's smile was harmonious and natural looking (Figure 18).

Conclusion

Not all smile makeovers are lim-

ited to the dentists we see on television. A good partnership with a qualified cosmetic dental laboratory may be all that is needed for success. New restorative materials appear on the market every day, and sorting through all the choices can be difficult. The best results come from having a relationship with a knowledgeable dental laboratory that has both expertise and access to all the latest materials. **C**

Reference

1. Sorensen JA, Torres TJ. *Improved color matching of metal ceramic restorations. Part 2. Bonded Porcelain Anterior Restorations.* Chicago, Ill: Quintessence; 2002:82-83.

Product References

Products: GC Lab Putty, GC Initial
Manufacturer: GC America, Inc.
Location: Alsip, Illinois
Phone: 800.323.7063
Web site: www.gcamerica.com

Products: Empress 1, Empress 2
Manufacturer: Ivoclar Vivadent
Location: Amherst, New York
Phone: 800.533.6825
Web site: www.ivoclarvivadent.com

Product: Procera
Manufacturer: Nobel Biocare
Location: Yorba Linda, California
Phone: 800.993.8100
Web site: www.nobelbiocare.com

Product: Lava
Manufacturer: 3M ESPE
Location: St. Paul, Minnesota
Phone: 888.364.3577
Web site: www.3m.com

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1. **In this case, the patient's goal was:**
 - a. a pleasant smile.
 - b. no orthodontic treatment.
 - c. shortest treatment time possible.
 - d. all of the above.
2. **According to the Table, which set of axial reduction and incisal reduction measurements are guidelines for popular all-ceramics?**
 - a. 1.0 mm and 1.5 mm
 - b. 1.5 mm and 2.0 mm
 - c. 2.0 mm and 1.5 mm
 - d. 0.8 and 1.5 mm
3. **The completed LSK 121 treatment plan wax-up is:**
 - a. detailed.
 - b. 3-dimensional.
 - c. full-color.
 - d. all of the above.
4. **The model with the clear stent has how many possible applications?**
 - a. 1
 - b. 2
 - c. 3
 - d. 4
5. **What can be used to verify the contours of the final restoration?**
 - a. Putty index
 - b. LSK 121 treatment plan wax-up
 - c. Clear stent
 - d. Lava zirconia
6. **The choice of material depends on:**
 - a. limitations of CAD/CAM.
 - b. metal allergies.
 - c. dentist's experience.
 - d. factors unique to each patient.
7. **No matter how esthetic the restorations are, without what in mind, they are not a success?**
 - a. marginal gap
 - b. longevity
 - c. hue
 - d. chroma
8. **The Lava zirconium oxide frameworks are:**
 - a. super-cooled before delivery.
 - b. cast using lost wax technique.
 - c. cast using injection molding.
 - d. fabricated by milling centers.
9. **The build-up is contoured according to:**
 - a. the wax-ups.
 - b. computer recreations.
 - c. electronic milling.
 - d. laser topographical mapping.
10. **The framework wall thickness of 0.5 mm or 0.3 mm is due to:**
 - a. milling limitations.
 - b. impression limitations.
 - c. high strength of zirconia.
 - d. shade stability requirements.

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