

The importance of surface texture and luster.

# SURFACE TEXTURE: MATCHING the SINGLE CENTRAL



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The single maxillary central incisor is perhaps a dental technician's most demanding restoration. Color, translucency, internal characterization, surface texture and luster are all essential elements critical to its success. While recent innovations in ceramics have greatly improved our ability to match a tooth's natural color, translucency and characteristic, the accurate reproduction of surface texture and luster remains a mechanical task that requires keen observation, thoughtful planning and execution. Matching the adjacent teeth's surface texture and luster is as crucial to a restoration's successful integration as is matching color and characterization and should not be overlooked.

**Key Words:**  
*texture, luster,  
essential  
elements, light  
reflection*

Surface texture directly influences the value, color saturation and zones of light reflection and absorption. An anterior restoration that does not exhibit surface texture and luster comparable to the adjacent natural teeth will immediately appear out of place, particularly when the surface of the surrounding dentition is complex or heavily textured. The natural tooth's surface is composed of horizontal and vertical concavities and convexities that vary in complexity and intensity from tooth to tooth. Achieving the desired level of esthetics in restorations is rarely possible when these structures are not faithfully replicated. Complex ceramic layering techniques may showcase the technician's skill level, but surface texture and luster showcase the restoration.

#### CASE OBJECTIVES and PRESENTATION

A 41-year-old female patient presented with a 20-year-old porcelain-to-metal crown. Beyond the poor esthetics of the crown, the tooth exhibited

recurrent decay and the surrounding soft tissue was inflamed. After reviewing the available treatment options, the patient opted for an all-ceramic replacement.

Upon returning to the office, the patient was anesthetized and the existing crown and underlying decay was removed. The tooth was reprepared and a temporary crown made from Luxatemp Fluorescence (Zenith DMG) acrylic was fabricated. After surface characterization was applied using the composite color modifiers (Kerr), the provisional was layered with a thin coat of light-cured glaze (Luxaglaze) to fix the color and characterization. The tooth was then scaled with an ultrasonic scaler prior to cementation of the provisional with a carboxylate cement (Durelon, 3M Espe). In order to achieve optimal gingival health for final impressions, the patient was sent home with a chlorohexidine solution (Oris Rx, Dentsply) and instructed to brush the affected area.



Fig 1. Shade mapping #9 with old porcelain-to-metal crown on #8.



Fig 2. Preparation of #8.



Fig 3. Temporary on #8 exhibiting the desired contour.



Fig 4. Zirconia coping (Procera) designed with a porcelain labial margin.



Fig 5. Porcelain labial margin adapted to the Zirconia coping (Procera).

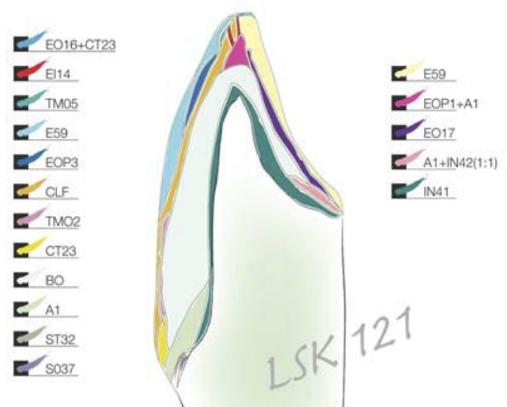


Fig 6. Initial ZR (GC) porcelain color mapping for crown.



Fig 7. Application of the dentin shade.

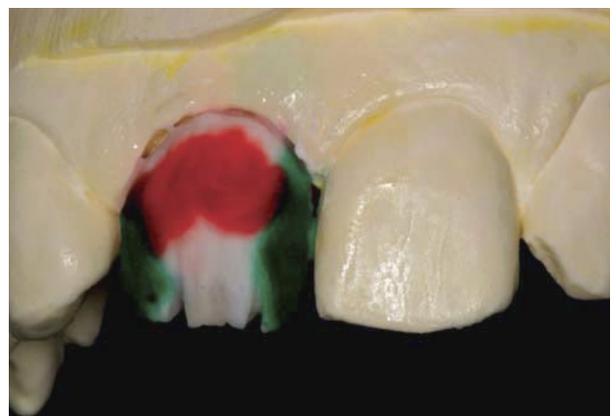


Fig 8. Colored enamels are placed on the mesial and distal. Cervical translucent orange color is applied to the cervical third.



Fig 9. Various enamel colors are placed

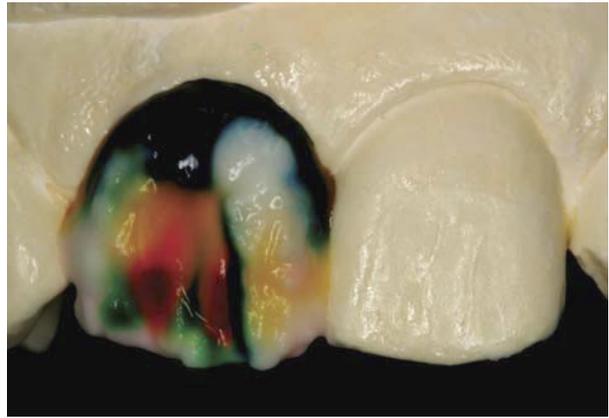


Fig 10. Enamel filter is applied over entire labial surface.

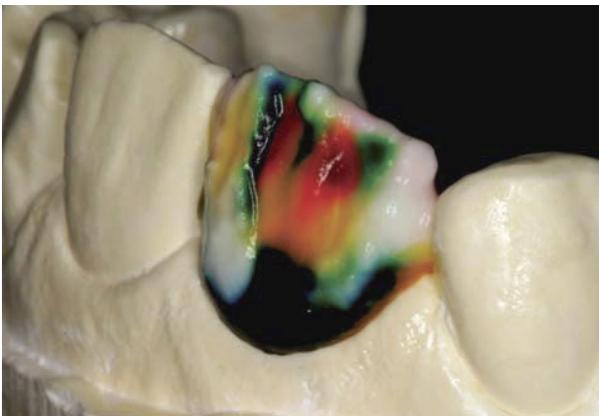


Fig 11. The enamel filter is 0.2mm thin.



Fig 12. The enamel filter will match the contour of the labial.



Fig 13. The enamel filter is completed and a modest amount of cervical translucent is applied.



Fig 14. The bisque-bake firing.

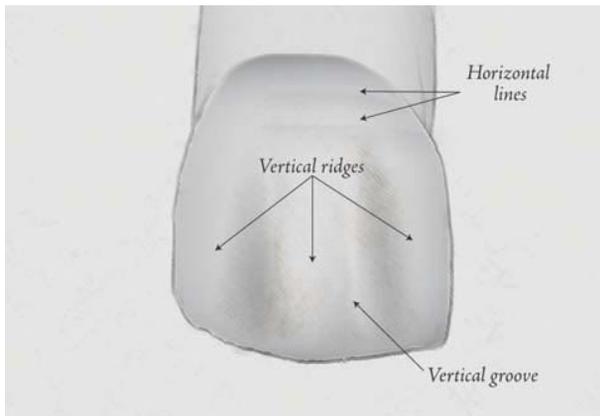


Fig 15. Mapping the surface texture of #9.

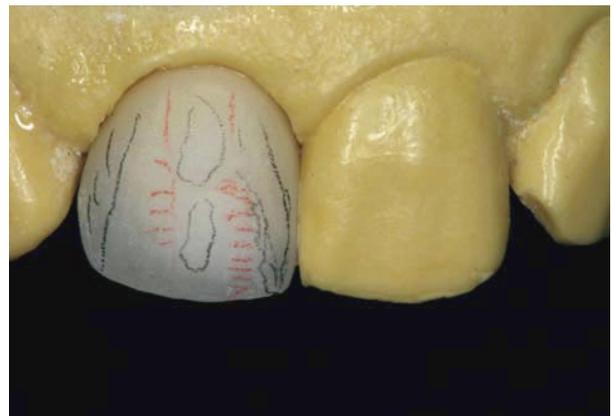


Fig 16. Surface-texture mapping transferred to #8.

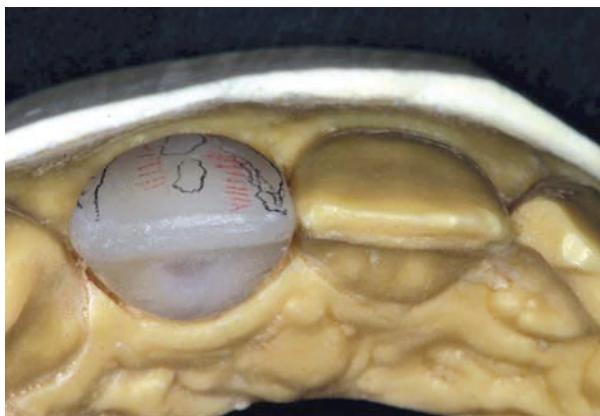


Fig 17. Incisal view of contour and surface topography.



Fig 18. The crown is naturally glazed then mechanically polished.

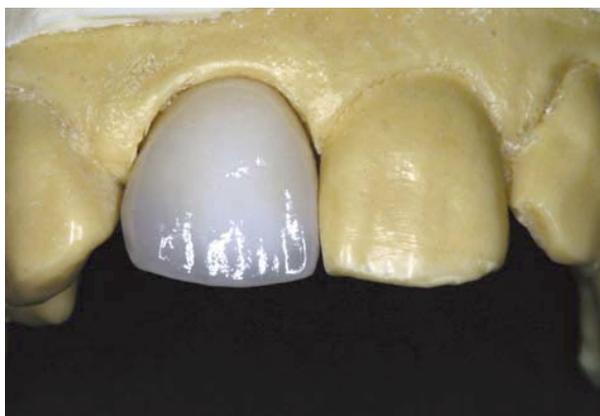


Fig 19. The texture of the incisal third after polishing.



Fig 20. The texture of the cervical third after polishing.

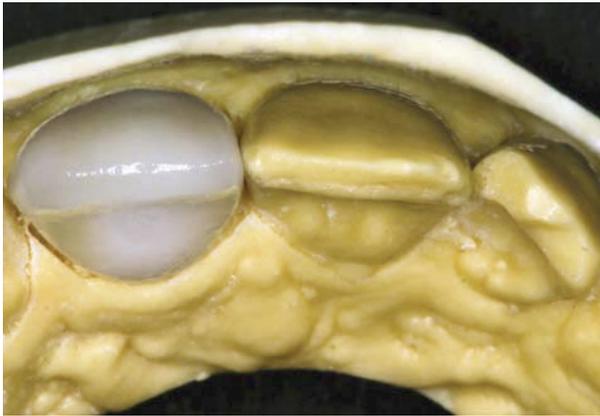


Fig 21. Incisal view of contour and surface topography.



Fig 22. Silver powder makes surface texture evaluation easier.



Fig 23. Finished restoration.



Fig 24. View after insertion. Note matching surface textures.



Fig 25. Lateral view illustrates segmentation of the color saturation.



Fig 26. The color, form and texture of the restoration are in harmony with the adjacent natural tooth.

**“Surface texture and luster are crucial to a restoration’s successful integration.”**

After three months, the tissue health was restored and impressions were taken (Xpasyll by Gunz for retraction, Clinician’s Choice triple tray and Aquasil Decca with LV wash by Dentsply). Before releasing the patient, Polaroid images of the teeth were taken with various shade tabs in view and she was instructed to contact the lab for a custom shade appointment. After a bisque-bake of the crown was complete, the patient returned to the lab for shade verification and further characterization.

During the cementation appointment, the patient was anesthetized and the tooth was lightly air abraded. Simplicity was used to prepare the tooth while an etching gel (Ceretch, Vident), silane and Dentastic Uno adhesive (Pulpdent) were used to prepare the crown. After the excess composite cement was removed (P4 Flowable, Dentsply), the restoration was light cured, utilizing an Ultralume 5 (Ultradent). Any remaining cement remnants were removed using a sharp scaler and a trimming bur (S.S. White #7901). The occlusion was then adjusted and the effected area was repolished with Axis polishing cups and points. A two-week post-operative visit revealed healthy tissue response, no sensitivity and a happy patient. <sup>dental</sup>dialogue

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**PRODUCT LIST**

Indication	Name	Manufacturer/Distributor
Acrylic for temp crown	Luxatemp Fluorescence	Zenith DMG
Composite color modifiers	Kolor + Plus	Kerr
Light-cured glaze	Luxaglaze	Zenith DMG
Carboxylate cement	Durelon	3M Espe
Chlorohexidine solution	Oris Rx	Dentsply
Retraction	Xpasyll	Gunz
Impression tray	Quad Tray	Clinician’s Choice
LV Wash	Aquasil Decca	Dentsply
Etching gel	Ceretch	Vident
Adhesive	Dentastic Uno	Pulpdent
Removes composite cement	P4 Flowable	Dentsply
Trimming burr	#7901	S.S. White
Polishing cups and points	–	Axis

**Bio**

Luke S. Kahng, CDT, is the founder and owner of Capital Dental Technology Laboratory, Inc. in Naperville, Illinois. His laboratory specializes in all-fixed restorations. Its division, LSK 121, provides highly personalized custom cosmetic work. Kahng developed the LSK Treatment Plan that focuses on a biomechanical design of occlusal surfaces for reconstructive and esthetic dentistry. He has also developed a series of shade conversion tables for porcelain. A strong proponent of collaborative dentistry, Kahng stresses education, communication and team approach to patient care.

Mr. Kahng is a clinician for GC America, Bisco, Captek and others. He is a frequent lecturer and program facilitator and regularly contributes to this for dentists and dental technicians. Kahng regularly contributes to this and other technical and clinical dental journals, including *Practical Procedures & Aesthetic Dentistry* and *Contemporary Esthetics*. He is master ceramist who has trained extensively with Russell DeVreugd, CDT, Dr. Frank Spear, Dr. Peter Dawson and a team of Oral Design members. Currently, he is a member of American Academy of Cosmetic Dentistry.



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