



Chairside

With Ross W. Nash, DDS

Functional and Esthetic Rehabilitation Using a Captek™ Bridge and Crowns Opposing Laminate Porcelain Veneers

It is often necessary to use more than one



DR. ROSS W. NASH is a clinical instructor at the Medical College of Georgia School of Dentistry and an Adjunct Professor at the Medical University of South Carolina School of Dentistry. He maintains a private practice in Charlotte, NC, where he focuses on esthetic and cosmetic dental treatment. A consultant to

numerous dental materials manufacturers and distributors, he is on the editorial board of the Esthetic Dentistry Research Group, which publishes REALITY. Dr. Nash is President of Nash/Engelhardt Seminars and Consulting with an educational facility dedicated to continuing dental education in Charlotte, NC. He is an accredited member and a Fellow in the American Academy of Cosmetic Dentistry. For information on seminars and consulting, please contact Mark Cody, Director of Operations, at 704-364-5272.

treatment modality when esthetically restoring function for patients. Occlusal considerations require that we take into account the wear potential of restorative materials. Even though modern porcelains are said to be more kind to natural dentition when in functional contact, there is still potential for accelerated wear of natural teeth in these situations. The ideal way to restore anterior guidance when providing Esthetic rehabilitation of opposing arches is to use porcelain against porcelain in functional excursions. Porcelain is still the most durable, long-lasting, wear-resistant, and stain-resistant material we have for esthetic treatment.

A Discussion About Occlusion

Ideal occlusion provides functional guidance with the anterior six maxillary and mandibular teeth.

The posterior teeth occlude only in centric contact. In protrusive movements, the incisal edges of the mandibular incisors guide against the lingual surfaces of in the maxillary incisors and the posterior teeth separate. In lateral movements, the incisal edges of the mandibular canines guide against the lingual surfaces of the maxillary canines and the posterior teeth again disocclude. The posterior teeth again, therefore, contact only in centric occlusion and the entire envelope of motion is performed against the six maxillary anterior teeth. This phenomenon protects the occlusal surfaces of the posterior teeth from wear. However, as a patient ages or experiences bruxism, the incisal edges of the anterior teeth begin to wear



Figure 1—Facial view in centric occlusion before treatment.



Figure 2—Occlusal view of maxillary arch before treatment.



Figure 3—Occlusal view of mandibular arch before treatment.



Figure 4—Occlusal view of maxillary teeth prepared for Captek restorations.



Figure 5—Occlusal view of mandibular teeth prepared for laminate veneers.



Figure 6—Facial view of prepared teeth.

away and the posterior teeth begin to contact during functional excursions. Now, the premolars contact in lateral and sometimes even protrusive movements. As the premolars wear, the molars come into functional contact. This is called group function.

It has long been known that, as a patient ages, anterior guidance is often lost as a result of wear and they develop into group function. This was considered natural and accepted as “okay.” However, the longer I practice dentistry the more I feel that group function is not “okay.” The reason for my thinking is that there is far more stress generated in lateral and protrusive function in the posterior areas due to the mere physics of being closer to the temporomandibular joint (TMJ). This can mean more stress on the joint itself. But even worse, the occlusal surfaces of the posterior teeth wear away and the mandible begins to close down and, as it does, it moves forward. Severe wear can actually result in the mandible moving forward far enough to create a Class 3 situation where the patient is severely overclosed. The only way to properly restore a patient like this is to increase their vertical dimension.

If we can intercept this pattern of anterior wear and restore anterior guidance for a patient before posterior occlusal wear takes place, I believe we perform a wonderful service for the patient. We have prevented overclosure and possible damage to the TMJ through higher stress. The esthetic benefits,

however, are excellent because the restored incisal edges of the maxillary anterior teeth provide a more youthful appearance and eliminate the aged appearance that goes with worn incisal edges. Almost everyone wants to look younger.

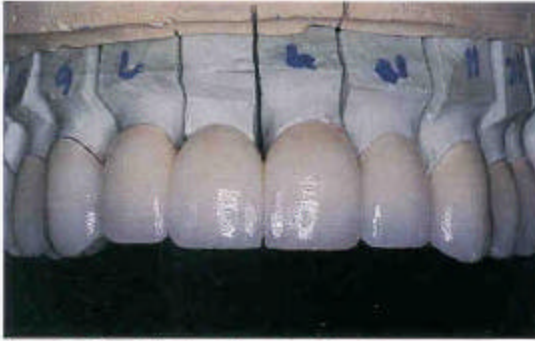


Figure 7—Captex™ restorations on working cast.



Figure 8—Captex™ restorations on mirror surface.



Figure 9—Captex™ three-unit bridge—facial view.



Figure 10—Captex™ three-unit bridge—internal surfaces.

Clinical Case

The Maxillary Arch

In the following clinical case, all the anterior teeth were restored to achieve the patient's goal of esthetic rehabilitation. However, we accomplished another important service: We established protrusive and lateral anterior guidance with contact on the restorative material. The patient mature woman, appeared with a temporary acrylic bridge already in place from her maxillary right central to her left lateral incisor. Figure 1 shows the facial view with her teeth closed in centric occlusion. She exhibited Class 1 occlusion with acceptable overbite and overjet. However, the current temporary bridge exhibited a slight negative smile line curving upward at the central position. We planned to lengthen the incisal edges in her final restoration to create a more pleasing smile line. The posterior plane of occlusion was good and the vertical dimension of occlusion was unaltered. The occlusal view in Figure 2 shows an acceptable arch form with previous porcelain-fused-to-metal crowns on her first and second premolars. The right central incisor had been extracted and the tissue here was still in a healing stage. The mandibular incisors exhibited a natural wear pattern and, in fact, had worn through the enamel to the underlying dentin on the incisal edges (Figure 3). The patient's desire was for lighter, more youthful-looking teeth.

The tissue at the extraction site where tooth No. 8 used to be had less-than-ideal contour, so the patient was referred to a periodontist for grafting. On healing, the patient's 10 maxillary most anterior teeth (second premolar to second premolar) were prepared for full-crown restorations (Figure 4). Captex™ was the material chosen for the maxillary crowns and bridge because of its excellent potential for esthetics and its superior strength characteristics. The metal foundation is strong enough for bridge work even though it is very thin. The warm gold color of the thin metal copings gives the overlying porcelain a true-to-life appearance. Minimal tooth preparation (1.0 mm axial and 1.5 mm incisal or occlusal reduction) is necessary to make room for this material. A chamfer margin at the level of the tissue height is all that is needed for esthetics because the gold coping is thin enough to be covered by porcelain without causing the margin to be thick and unnaturally overcontoured. Therefore, no subgingival preparation is required and the tissue health is maximized.



Figure 11—Porcelain laminate veneers on working model.



Figure 12—Porcelain laminate veneers—facial surfaces.

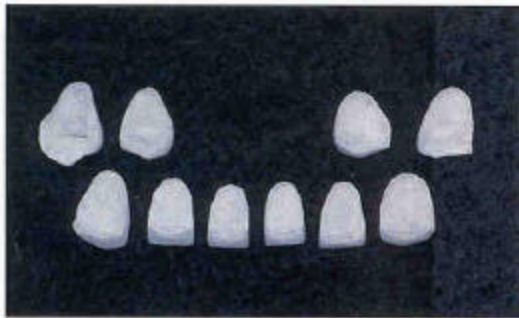


Figure 13—Porcelain laminate veneers—internal etched surfaces.

The Mandibular Arch

The mandibular incisors and premolars were conservatively prepared for porcelain laminates (Figure 5) with only 0.5 mm of facial reduction and 1.0 mm of incisal and occlusal reduction. The objective of these restorations was to create a more pleasing esthetic appearance while providing a functional surface in porcelain surfaces. Figure 6 illustrates the maxillary and mandibular prepared teeth from the facial view.

Impressions, Occlusal Registration, and Temporizations

Final full-arch impressions were taken using a polyvinyl siloxane material (Half Time™_b). No retraction cord was needed because of the supragingival preparation of the margins. A hard acrylic occlusal registration was taken (Pattern Resin™_c) to properly mount the models on a semiadjustable articulator. Provisional restorations were fabricated with Luxatemp®_d at the chair using vacuum-formed shims made from preoperative wax-up models made at the dental laboratory. The maxillary temporary crowns were made as a single unit splint and cemented with Temp-Bond®_e, temporary cement. The mandibular provisional restorations were made in the same fashion using Luxatemp®. However, a resin temporary cement (Temp-Bond® Clear_e) was used for these provisionals because it adheres well to both teeth and temporary materials.

The Final Restorations

Figure 7 shows the final Captek™ restorations on the working model. Figure 8 shows all the Captek™ restorations photographed on a mirror surface. Note the warm gold color of the coping material and thin margins covered in porcelain. Figure 9 shows a close-up of the Captek™ three-unit bridge replacing tooth No. 9. Note the vitality, the gingivoincisor blend of colors, and the natural incisal translucency created in the dental laboratory. Figure 10 illustrates very thin margins covered with porcelain for esthetics. We can also see the formation of natural proximal embrasures and the ovate pontic shape.

In Figure 11, the porcelain laminate veneers (Optec™ hsp_f) can be seen on the working model. Figure 12 shows the external surfaces with beautiful gingival and incisal tones and translucent incisal edges. The internal etched surfaces of the porcelain laminates are seen in Figure 13.

b Discus Dental, Los Angeles, CA 90064
c GC Lab Technologies, Lockport, IL 60441
d Foremost Dental Mfg, Co, Inc, Zenith/DMG, Englewood, NJ 07631
e Kerr & Corporation, Orange CA 92867



Figure 14—Final result—facial view.



Figure 15—Captek™ restorations—occlusal view.



Figure 16—Porcelain laminate veneers—occlusal view.



Figure 17—Centric occlusion.

Placement Techniques

Maxillary Captek™ Restorations

All the restorations were tried in after removing the provisionals, and the patient approved their appearance. Fit and marginal integrity were evaluated and approved. The patient was asked to lightly close with the restorations temporarily seated to make sure occlusal contact was achieved, but no biting pressure was applied because this might cause breakage of the thin laminates before bonding. Occlusal adjustments for laminates must be made after they are bonded to place.

The maxillary Captek™ restorations were cemented in place using a resin cement (Cement-It!TM_f). The patient was anesthetized and the prepared teeth were thoroughly cleaned with pumice and water. No retraction cord was needed because the tissue health is was excellent and bleeding or sulcular fluids were not a factor. If tissue health is less than ideal, retraction cord may be needed for placement. The prepared tooth surfaces were conditioned with 37% phosphoric acid for 5 to 15 seconds and rinsed thoroughly to remove the smear layer of dentin. The teeth were left slightly moist for the wet bonding technique. A dentin desensitizer and wetting agent (HurriSeal[®]_g) was applied with a soft bristle brush. The teeth were saturated with this material for 20 seconds and the excess moisture was evacuated away. The prepared teeth, however, were left slightly moist with the HurriSeal[®].

A dentin primer (Bond-It!TM_f) was applied liberally for 20 seconds and lightly air dried to remove the alcohol carrier. A glossy surface remained on the prepared surfaces of the teeth, indicating that the hybrid layer had been formed. A bonding agent was then applied (Bond-It!TM) and left without light curing. A self-curing resin cement (Cement-It!TM) was mixed and a thin layer was painted on the internal surfaces of the Captek™ crowns. They were all placed at once and held with firm finger pressure until the cement hardened. The excess resin cement was then removed using a scaler and dental floss.

f Jeneric[®]/Pentron[®], Inc, Wallingford, CT 06492
g Beutlich Pharmaceuticals, Waukegan, IL 60085

Mandibular Laminate Veneers

The mandibular teeth prepared for laminates were cleaned with pumice and water. They were etched with 73% phosphoric acid for 15 seconds and thoroughly rinsed with water spray (but left moist). A wetting and desensitizing agent (HurriSeal®) was placed on all prepared and etched tooth surfaces using a soft brush; the teeth were allowed to remain saturated with the material for 20 seconds. The excess HurriSeal® was removed with a high-speed evacuation tip, but the teeth were left moist with the material for the wet-bonding technique. A dentin primer (OptiBond™_e) was applied using a small cotton-tipped applicator; after 15 seconds of application, it was lightly dried to remove the carrier. A glossy surface was evident on all the prepared tooth surfaces, indicating that the hybrid layer had been formed. A dual-curing bonding agent (OptiBond™ Dual Cure_e) was applied with an applicator tip and left moist and uncured.

The internal etched surfaces of the veneers were previously treated with silane after try-in and allowed to dry. The bonding agent was used to slightly wet the internal surfaces of the veneers, and a dual-curing luting agent (Nexus_e) was mixed and placed into each veneer. The veneers were placed on the prepared tooth surfaces all at once and held in place until the dual-curing resin luting agent reached a gel state (3 to 3 1/2 minutes after the start of the mix). The excess resin was then lightly teased away and floss was gently worked into the interproximal areas to remove excess there. Where the floss could not go through easily, the interproximal excess was left until after light curing. After most of the excess was cleaned away, the luting agent was light cured using a visible light curing unit (Demetron Optilux Light_e). Excess cured resin luting agent was removed using carbide finishing burs (Esthetic trimming (ET) Burs_h) in a highspeed handpiece. Excess interproximal resin was removed first using a CeriSaw™_i, followed by fine finishing diamond interproximal strips (Gateway™Diamond Strip_h). Final interproximal polishing was accomplished using EpiteX™_j aluminum oxide polishing strips.



Figure 18—Pretrusive guidance—posterior disocclusion.



Figure 19—Right canine guidance—posterior disocclusion.



Figure 20—Left canine guidance—posterior disocclusion.



Figure 21—The patient's new smile.

Occlusal Adjustment

Final occlusal adjustments were accomplished using fine diamond burs (ET™ Finishing Kit^h) followed by 30-fluted finishing burs^h. A glazed surface was then achieved using porcelain polishing points and cups^k.

Figure Result and Conclusion

Figure 14 shows the final result from the facial view. Note the excellent esthetics and tissue health. Note also that we accomplished our goal of eliminating the reverse curve in the anterior smile line. Occlusal views of the maxillary and mandibular arches can be seen in Figures 15 and 16, respectively. Centric occlusion is illustrated in Figure 17. Protrusive guidance with posterior disocclusion is seen in Figure 18; right and left lateral canine guidance with posterior disocclusion are illustrated in Figure 19 and 20. We accomplished esthetic and functional rehabilitation using the modalities of Captek™ crowns and bridges on the maxillary arch and bonded laminate veneers on the mandibular arch. The patient's attractive new smile can be seen in the full-face view in Figure 21.

Acknowledgment

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^h Brasseler USA®, Savannah, GA 31419

ⁱ Den-Mat, Santa Maria, CA 93456

^j GC America, Inc, Alsip, IL 60803

^k SHOFU® Dental Corporation, Menlo park, CA 94025