

The Lighter Side of ‘Bread-and-Butter Dentistry’



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With all of the excitement in the media concerning cosmetic dental makeovers and “spa dentistry,” it’s possible sometimes for dentists to lose our focus. The root of dentistry is still restorative treatment in the posterior regions to eliminate caries, repair fractures, and replace restorations whose warranties have long expired. This, after all, is the “bread and butter” of dentistry. There will always be a place for cosmetic dentistry. We will continue in our efforts to make the patient as comfortable as possible. However, the foundation of dentistry should always be based on providing optimal, comprehensive dental care for patients using the best materials and techniques available.

All treatment planning should begin with an assessment of periodontal health, elimination of caries, replacement of broken amalgam fillings, and a personal evaluation of old and unaesthetic PFM crowns. Quality posterior restorative dentistry is difficult. However, it is more objective and can therefore be less frustrating than the subjectivity involved with

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cosmetic dentistry. Your patients will always appreciate your efforts to conserve, preserve, and save their teeth.

So now, it’s back to the basics, with a new twist on materials and techniques to improve on the restorative dentistry of yesterday.

ADVANCES AND ALTERNATIVES

The science of dental materials is constantly improving. Exciting advances in CAD-CAM zirconia-based ceramic systems such as Lava (3M ESPE) and Cercon (DENTSPLY) allow us to offer metal-free alternatives to restore broken down teeth or replace unnatural metal or PFM restorations. These new ceramic crowns and bridgework can greatly improve aesthetics and biocompatibility and provide an overall



Figure 1. Pre-op occlusal view of lower arch showing defective silver fillings on Nos. 19, 20, 29, and 31 and non-precious metal crown No. 30.



Figure 2. Pre-op occlusal view of upper left quadrant.



Figure 3. Pre-op buccal view of upper left quadrant showing opaque No. 13 PFM crown with black marginal line and No. 14 defective mesio-occlusal silver filling.

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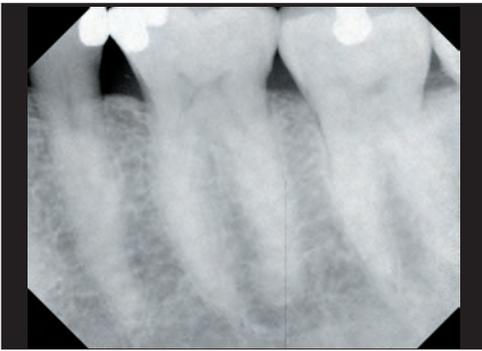


Figure 4. DEXIS Digital radiograph of endodontic abscess on No. 19.

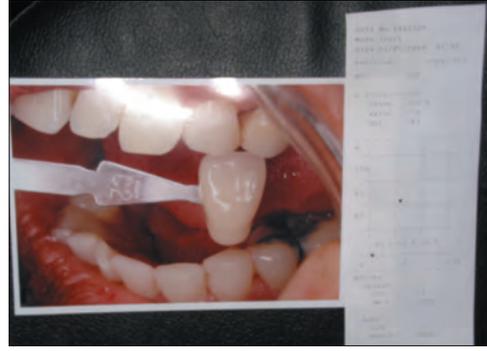


Figure 5. Digital photograph of shade tab with Shofu shade slip for laboratory shade matching.

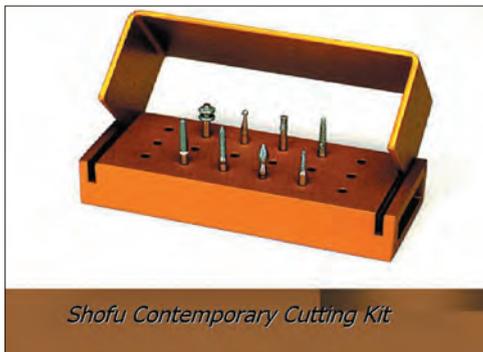


Figure 6. Shofu Contemporary Cutting Kit.



Figure 7. Bident Bipolar Electrosurgery tip used to remove excessive inflamed gingival tissue.



Figure 8. Porcelain to metal crown versus Lava restoration.



Figure 9. Lower right quadrant labwork.

more natural feeling while still providing the stability and strength required for proper function.¹

Indirect composite resin systems that are pressure-, light-, or heat-cured or a combination of these, such as Sinfony (3M ESPE), Belle-glass (Kerr), Cristobal (DENT-SPLY), and Tescara (Bisco), offer excellent alternatives to full-coverage crowns. Although incipient or initial decay can be predictably restored with a direct resin filling, a stronger and more stable material is needed for teeth with larger lesions or that will be under greater occlusal loads.² When replacing defective amalgam fillings, consider that G.V. Black's principles of extension for prevention often

resulted in large preparations that required a certain depth and width for bulk strength. It was also necessary to create undercuts in the tooth for retention. Furthermore, caries detection systems didn't even exist when most of these teeth were filled.

For most practicing clinicians, these large cracked and carious fillings simply cannot be consistently and predictably refilled with direct resins, especially those with wide interproximal contacts and deep gingival box margins. In these cases, variables such as inadequate depth of cure, polymerization shrinkage, and the potential for microleakage make indirect composite inlays a more desirable choice than direct

resins.³ Replacing defective amalgam fillings with aesthetic, conservative, and affordable restorations is a wonderful service that can be appreciated by your patient, encouraging proactive quadrant or full-mouth dentistry.

CASE PRESENTATION

This 52-year-old woman's primary dental problem was pain in her right and left lower first molars. She was also concerned about the "black color" of her old silver fillings. In addition, these teeth felt "weak" and sensitive to cold. Her gums were bleeding and tender around old crowns in her upper left and lower right quadrants, and she had a swollen gum abscess in her lower left area.

Clinical examination re-

vealed 10- and 20-year-old silver restorations with defective margins in teeth Nos. 14, 19, 20, 29, and 31 (Figures 1 and 2). Tooth No. 13 had an opaque PFM crown with black marginal lines and a distal open interproximal contact that was a food trap (Figure 3). The fairly small mesio-occlusal amalgam filling in tooth No. 19 had caused a fracture that led to a clinically and radiographically evident endodontic/periodontal abscess (Figure 4). The disto-occlusal amalgam filling in tooth No. 20 had enough recurrent decay and cracks to consider restoring with full coverage. Finally, the patient expressed that tooth No. 30 had "never felt good and looked horrible" after being endodontically treated and restored with a nonprecious metal crown.

Prioritizing the health and appearance of her smile, this patient accepted a restorative plan consisting of the following: endodontic treatment of tooth No. 19 and retreatment of tooth No. 30; replacement of her old amalgam fillings in teeth Nos. 14, 29, and 31 with Sinfony composite inlays; and buildups and Lava crowns for teeth Nos. 13, 19, 20, and 30.

Recreating Nature

When restoring teeth, we always want to conserve tooth structure while duplicating or improving nature. With this in mind, we begin treatment with pre-op impressions for the lab to use to recreate the original tooth's form and function. Without pre-op models, the lab will fabricate a functional crown based on fit, contact, and occlusion, with placement of cusps in relation to adjacent and opposing teeth. The rest is guesswork. Little regard is given to the unique morphology of the original natural tooth, ie, functional and nonsupporting cusps, length, and emergence profile. It's an estimate at best. This often results in crowns that feel too short or too long, bulky or foreign, require multiple adjustments, and take time (if ever) to feel natural.

Given a pre-op model, the laboratory has a guide to recreate both the appearance and, more importantly, the feel of the natural tooth. The resulting restorations will

truly fit and feel better in the patient's mouth. This pre-op impression also can be used as a matrix to create near-perfect bis-acrylic temporaries. Because of the tight adaptation, trimming is minimal. In fact, the pre-op impression can actually help with tissue control before the final impressions.

From experience, the authors have found that the time and extra expense of material is worth it for the patient, especially if he or she has had previous crowns not using this technique. Patients truly feel and appreciate the extra effort from temporization to final crown. This can make all the difference between providing standard dentistry and offering special treatment that the patient will rave about. Providing such good-looking and natural-feeling restorations helps build patient confidence in your skills and can help encourage acceptance of additional needed treatment. As your patients realize the value of your dentistry, you can build a thriving practice around high-quality patients who appreciate your care.⁴

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Pre-op Work

Full-arch, fast-setting polyvinylsiloxane impressions were taken. These pre-op impressions were first used as a matrix for fabrication of the provisionals. They were then forwarded to the laboratory, along with the final impressions and records as a guide for the final zirconia-based ceramic crowns.

A computerized shade-taking device, the ShadeEye-NCC Chroma Meter (Shofu Dental), was used to assist with shade reproduction. It accurately and consistently measures the exact shade, hue, and value of a tooth at the push of a button. This shade formula is printed with a porcelain recipe to match the shade of the tooth to be duplicated.⁵ The print-

out gave a reading of Shade C2/Hue R2 for tooth No. 21. A digital photograph of these shades next to the adjacent teeth to be color-matched was taken and printed on quality photographic paper (Figure 5). This digital photograph allows the laboratory to match the shade and recreate distinct artifacts for a lifelike crown that will blend in with the adjacent natural teeth.⁶ The photograph and Shofu shade slip are always forwarded to the laboratory with every case.

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Preparation

After the patient completed endodontic treatment of tooth No. 19 and re-treatment of tooth No. 30, restorative treatment was initiated. Once local anesthesia was complete, the split rubber dam technique was used to isolate the field and prevent the patient from swallowing metal or amalgam. Each of the 3 quadrants was prepared using diamond burs from the Shofu Contemporary Cutting Kit (Figure 6). Rapid removal of the existing mercury fillings in teeth Nos. 14, 29, and 31 was accomplished using the hour-glass-shaped diamond bur (0861-1) from the kit. Underlying decay was removed initially using a round diamond bur (0872-1), and finally with gentle air abrasion. These teeth were prepared for indirect composite inlays with preservation of tooth structure as our goal. A caries detector was used to verify the absence of carious tooth structure.

For the conservative inlay preparations, we use a self-etching adhesive agent and a flowable composite resin base in order to seal the resulting dentinal layer and block out undercuts. In this case, we used Prompt L-Pop (3M ESPE) and Filtek Flow (3M ESPE). The built-up preparations were completely cured, and a superfine, round-end tapered diamond (836V-1) was used to round

all internal line angles and refine the slightly divergent inlay preparations.

The existing crowns on teeth No. 13 and No. 30 were sectioned using a coarse diamond (0835-1) and removed using a hand instrument. In preparation for teeth No. 13, 19, 20, and 30 Lava restorations, all old materials and caries were removed using a round diamond bur (0872-1) and gentle air abrasion. Once again, complete caries excavation was verified using a caries detector. A bonded core buildup was used for tooth No. 19. A bonded post and core buildup was required for nonvital tooth No. 30 for crown retention because of the significant loss of tooth structure.⁷

Preparation for Lava crowns requires a circumferential chamfer or rounded shoulder at an angle of 4° or greater and 0.5 mm in depth. A small, round diamond bur (0872-1) was used to define the preparation margins, and round-end taper diamonds (0835-1 coarse and 836V-1 superfine) were used to prepare the facial and peripheral aspects of the preparations and round all external line angles.

Gingival Tissues

Although generalized periodontal health was good, the bulky contours of the previous crowns and subgingival fillings had created swollen interproximal and gingival margin tissues. In preparation for gingival contouring using the Bident Bipolar Electrosurgery Unit, lidocaine with 1:100,000 epinephrine was injected into the infected area. Bident provides both cutting and coagulation of tissue, and unlike monopolar electrosurgery, actually works best under a water and air spray. Tissue shrinkage is highly reduced through less heat and spread of current. The complete absence of tissue charring and burning results in much more rapid and complete patient healing compared to conventional electrosurgery and laser therapy.⁸

The Bident tip No. 3303 was used in cutting mode under an air/water spray to excise excessive unhealthy tissues where needed (Figure 7). The coagulation mode was then used to minimize bleed-



Figure 10. No. 13 prepped for crown and No. 14 prepped for mesio-occlusal inlay.



Figure 11. No. 13 Lava restoration and No. 14 Sinfony inlay seated on stone model.



Figure 12. Mounting sticks aid in seating restorations in posterior regions.



Figure 13. Shofu Contemporary Polishing Kit.



Figure 14. Post-op right side buccal view: Lava restorations for No. 13, 19, and 20, and No. 14 Sinfony inlay.



Figure 15. Post-op lower arch.

ing in preparation for impression taking. In order to further control any seepage, Expa-syl (Kerr) gingival retraction material was placed around each abutment gingival margin for 4 minutes.

Impression Taking

The Expa-syl material was thoroughly rinsed off using a combination of water and air spray. Impregum Soft (3M ESPE) polyether impression material was chosen for the final full-arch impressions because of its accuracy and dimensional stability. The material was loaded into a single-use Directed Flow impression tray (3M ESPE). This disposable tray's self-retentive fleece strip eliminates the need for adhesive and is designed with "spoil-ers" that minimize flow defects and distal voids. The

hydrophilic impression material was dispensed by a thin-nozzled syringe onto the preparations and dispersed using an air syringe. After seating the loaded full-arch tray, the impressions were held firmly in place for 6 minutes before removal.

Temporization

ProTemp (3M ESPE) bis-acrylic resin temporaries in shade A2 were fabricated using the pre-op impressions as matrices. A water-soluble jelly was used to coat the abutments lightly to allow easy removal of the provisionals for polishing and cementation. The impression of the abutment teeth was filled with dual-cured temporary restorative material, and the impression was completely resealed onto the teeth. For each quadrant, a

connected temporary was made for each adjacent crown/interproximal inlay combination (ie, teeth Nos. 13 and 14, Nos. 19 and 20, and Nos. 29 to 31). The resulting temporaries were adjusted and polished in the lab and seated using calcium hydroxide.

Lab Work and Materials

Zirconia-based ceramic systems such as Lava and Cercon offer exceptionally strong yet lightweight frameworks with superior aesthetics. In this case, the Lava system was chosen to crown teeth Nos. 13, 19, 20, and 30. The new, updated Lava system utilizes core frameworks that can be colored using the 7 Vita-Classic shades. Its

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unique veneering ceramic system can be stained to create vital and natural-looking restorations.⁹

Compared to the heavy weight of PFM and non-precious metal restorations, the Lava system is much lighter and more like natural enamel. Empirical studies done at Dale Dental in Richardson, Tex, demonstrate that Lava zirconia comes closest to matching the weight of a similar volume of enamel. Semiprecious metals are approximately 1.5 times heavier than the

strong and highly durable Lava material, and precious metals can be as much as 3 times heavier. Figure 8 compares PFM crowns next to lightweight Lava restorations. Replacement with the much lighter Lava crown (Figure 9) not only greatly improves aesthetics and gives more of the feel and weight of natural dentition, but it can also decrease thermal conductivity, improve gingival health, and due to its natural mass, may even help reduce occlusal and TMJ stress.

Advances in indirect composite resin systems such as Sinfony (3M ESPE), Belle-glass (Kerr), Cristobal (DENT-SPLY), and Tescara (Bisco) provide conservative restorations with exceptional aesthetics and translucency, excellent marginal fit, and resistance to fracture and chipping. The vaccum/light-cured Sinfony microhybrid system was chosen in this case to replace the failing amalgam restorations in teeth Nos. 14, 29, and 31. Sinfony's thixotropic material allows a flowable buildup and layering technique that results in beautiful restorations with optimal aesthetics. The bonded restorations exhibit easy finishing and polishing, increased wear compatibility with natural dentition, and resistance to stain and plaque formation.¹⁰

Seating Appointment

The resin temporaries were taken off using hemostats and a spoon excavator. Any residual temporary cement was removed with a rubber cup and pumice followed by gentle air abrasion as necessary. The Lava crowns and Sinfony inlays were tried in to verify the excellent marginal fit and aesthetics and check the interproximal contacts and occlusion. Figures 10 and 11 show abutments Nos. 13 and 14 and restorations in preparation for seating. Mounting sticks were placed on the occlusal surfaces of the restorations to ease in the placement and seating process (Figure 12).

The Lava restorations (teeth Nos. 14, 19, 20, and 30) and Sinfony inlays (teeth Nos. 13, 29, and 31) were seated using RelyX Unicem cement (3M ESPE), a self-etching, dual-cure resin

Advances in indirect composite resin systems... provide conservative restorations with exceptional aesthetics...

cement. Pretreatment steps with separate primers or adhesives are not needed with Unicem, further decreasing the chances of post-operative sensitivity while providing strong adhesion with just one working step.¹¹

After cementation, all contacts were flossed, and excess resin was removed using a microbrush. The bonded restorations were then thoroughly cured. When polymerization was complete, the gingival marginal flash was removed with hand instrumentation using a Bard Parker blade No. 12. The Shofu Contemporary Polishing Kit (Figure 13), which includes 6 shapes of fine and superfine NTI diamonds, was used with the lightweight, vibration-free ProphyMiracle precise-speed handpiece (Twist2it) for final polishing. Interproximal contacts were verified with floss.

CONCLUSION

After the seat appointment, the patient was immediately thrilled with the aesthetics of her new smile. She no longer showed black margins, opaque color, or large silver teeth when she smiled or talked. The translucent, aesthetic restorations blended in perfectly with her natural dentition (Figures 14 and 15). Most importantly, post-op checkups revealed that gingival health had greatly improved, and all previous pain and sensitivity had disappeared. She no longer had a metallic taste. Her teeth seemed to feel lighter and more natural. She expressed her extreme gratitude at saving her other teeth from seemingly inevitable root canals and crowns. To quote directly from her, her mouth hadn't "looked or felt this great in many, many years!"

Restorative dentistry continues to offer great satisfaction to the practitioner as the foundation of his or her practice, while restoring com-

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fort, function, and aesthetics to the patient. The goal should be to address the true dental concerns of the patient and deliver the required services with excellence. This can only be done by keeping abreast of the most innovative techniques and materials available and using the advances in technology to provide patients with long-lasting, natural-looking restorations.†

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Dr. Berland is both accredited and a fellow of the American Academy of Cosmetic Dentistry. He is one of the most sought after speakers and published authors on cosmetic dentistry in America and has been featured in national and regional magazines, major dental journals, and NBC News, Fox News, and ABC's 20/20. For more information on "The Latest and Greatest in Cosmetic Dentistry: A Full Mouth Rehabilitation in Two Appointments" and denturewearers.com call (214) 999-0110 or visit www.dallasdentalspa.com.

Disclosure: Dr. Berland is the developer of the Lorin Library.

Dr. Williams practices in Dallas with Dr. Berland. She has won numerous awards for her genetic research on tooth development at international dental meetings and has co-written many clinical articles with Dr. Berland for leading dental journals.

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