Simplifying the Cementation of Porcelain Onlays

By Jose-Luis Ruiz, DDS, FAGD

The use of full porcelain restorations is increasing, offering the advantages of excellent aesthetics, less tooth reduction than porcelain-fused-to-metal (PFM) crowns, and kindness to the gingival tissues. One reason these types of restorations are not more popular, though, is their technique sensitivity. As reported in the text, *Esthetic Dentistry, A Clinical Approach to Techniques and Materials* (Dale and Aschheim; Mosby), resin cementation of these restorations can require up to 22 steps, any of which can lead to failure if performed incorrectly.

Mainly because of this complicated and technique sensitive cementation, many dentists turn to PFM crowns as the primary indirect aesthetic restorative option. PFM crowns require more aggressive preparation and difficult tissue management, including aggressive cord packing; they are less aesthetically pleasing; and they sometimes require gingival removal. However, their cementation is easy and predictable. Simplification of the cementation of full porcelain restorations would be a huge step forward in aesthetic dentistry.

Utilizing a new technique as described in this article has made the cementation of porcelain onlays a more routine and enjoyable procedure.

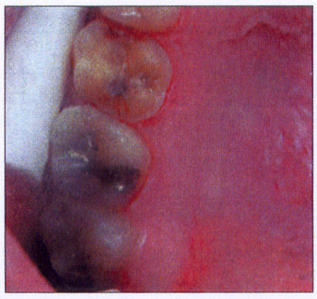

Figure 1. Molar isolated for cementation.

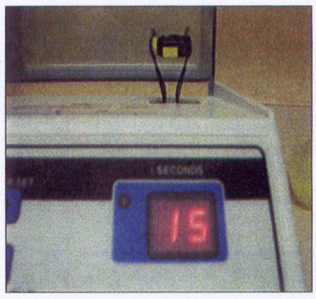

Figure 2. Mixing RelyX Unicem cement.

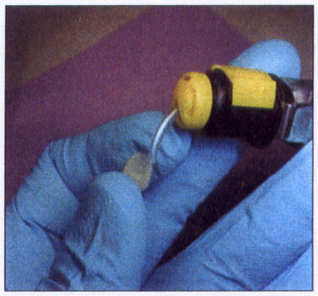

Figure 3. Applying cement into the onlay.

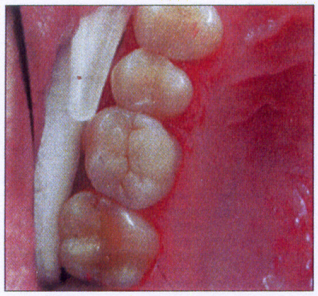

Figure 4. Finished restoration.

With society demanding a more attractive smile,[1] and an increased life expectancy demanding more conservative dentistry, patients are continually refusing the "ideal" gold onlay even after being presented with its many advantages.[2] For a patient who places an emphasis on aesthetics, the treatment of choice for a small cavity is a composite filling. However, when the same patient presents with a larger cavity, large composites may be a less attractive choice. Likewise, when the patient refuses a gold onlay because of its unattractive appearance, the most commonly used restoration is a PFM crown.

A more ideal option, however, would be a porcelain onlay,[3] as it conserves existing dentition, is gentle to the gingival tissue, and is more aesthetically pleasing. It is this author's opinion that more dentists are not utilizing porcelain onlays or all-porcelain restorations because they need to be bonded and cemented utilizing resin cement,[4] which is a more technique sensitive procedure.

The preparation and impression technique for porcelain onlays is much simpler than that for a PFM. Because all preparation is supragingival, no cord or tissue management is needed, and less tooth reduction is required. Eliminating the need for tissue management, accordingly, makes it easier to take an impression. Until recently, the only difficult part of the treatment was the cementation.

CONVENTIONAL TECHNIQUE FOR CEMENTING PORCELAIN ONLAYS

Conventional onlay cementation utilizing a total-etch bonding system is very technique sensitive.[5] The many complicated steps required create the possibility for error and failure, including postoperative sensitivity or onlay fracture because of cementation error. Conventional onlay cementation requires more than 13 separate steps (Table 1). The time spent following these steps can be without a doubt the most stressful few minutes of the dentist's day, since any mistake can lead to failure.

NEW TECHNIQUE FOR CEMENTING PORCELAIN ONLAYS

This article presents a case report using a technique for cementing porcelain onlays that requires less than half the steps and half the time of conventional techniques. The cement used in this technique is RelyX Unicem Self-Adhesive Universal Resin Cement (3M ESPE). The restoration should be porcelain etched and silanated.[6] However, because the cementation can be accomplished so quickly, isolation is much easier and there is no need to use desensitizer, as the material is a self-etch/self-bond system, and sensitivity is almost nonexistent. The cement is then mixed and the restoration

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inserted in the mouth. Note that care should be placed in properly curing the cement,[7] although the material is dual-cure. After cleaning residual cement, the dentist then can finish as usual. Table 2 depicts this new technique.

CASE REPORT

The following case report demonstrates how utilizing this new cementation technique for porcelain onlays requires significantly less steps than a conventional technique. This ultimately saves the dentist time while offering the patient aesthetically pleasing results and reducing the risk of discomfort.

A 41-year-old male presented with a large 20-year-old amalgam filling that was broken and leaking, with extensive cuspal fracture. As the patient insisted that no visible metal be utilized, treatment options were limited, as damage to the tooth was too extensive for a conventional composite filling. Accordingly, the only remaining option was a PFM or more conservative nonmetal onlay. After being presented with both options, the patient chose an onlay.

The initial preparation visit is, as mentioned, considerably simplified and shortened because tooth preparation is less complicated, no tissue management is needed, and impression taking is easier because margins are supragingival.

TECHNIQUE

Step 1. Pretreatment of the restoration was accomplished according to the manufacturer's recommendation. In this case, the porcelain onlay was silane treated after try-in and clean-up.

Step 2. After removal of the temporary restoration, the tooth was thoroughly cleaned utilizing a pumice and water slurry.

Step 3. The tooth was isolated. Note: Because cementation will be accomplished very rapidly, simple cotton roll isolation usually is sufficient (Figure 1).

Step 4. RelyX Unicem Self-Adhesive Universal Resin Cement was activated by inserting the Aplicap (3M ESPE) capsule into the Activator. The handle was pressed down completely and held for 2 to 4 seconds. The activated capsule was inserted into the mixing device and mixed for 15 seconds at high speed (Figure 2).

Step 5. Cement was applied to the restoration and tooth, ensuring margins were wet with cement (Figure 3). The restoration was inserted using gentle pressure.

Step 6. The composite was polymerized utilizing a curing light for 3 seconds on the buccal and lingual surfaces.

Step 7. Excess cement was removed, and the interproximal areas were carefully flossed.

Step 8. After the cement was thoroughly cleaned, a full cure cycle was performed (or, allow the material to self-cure for 5 minutes from start

Table 1. With Conventional Cementation Technique Utilizing Any Total-Etch Bonding System, Strict Isolation Is Essential and Must Be Maintained for Several Minutes.

Tooth Preparation:	Onlay Preparation:
(1) Isolate	(1) Porcelain Etch
(2) Etch (30 seconds)	(2) Apply Silane
(3) Rinse (10 seconds)	(3) Apply Primer
(4) Apply Desensitizer (60 seconds)	
(5) Apply Primer (20 seconds)	
(6) Apply Bond	
(7) Mix and Apply Cement	
(8) Seat Restoration	
(9) Light Cure	
(10) Clean and Finish	

Table 2. Reduced Number of Steps With New Cementation Technique.

Tooth Preparation:	Onlay Preparation:
(1) Isolate	(1) Porcelain Etch
(2) Mix and Apply Cement	(2) Silane
(3) Seat Restoration	
(4) Cure	
(5) Clean and Finish	

of mix). Note: At this time, the margins were finished with the appropriate finishing burs, strips, and polishing system.

Figure 4 depicts the completed restoration.

CONCLUSION

Utilizing a new technique as described in this article has made the cementation of porcelain onlays a more routine and enjoyable procedure. Whereas bonded restorations require strict isolation throughout the procedure, and the conventional cementation appointment has been viewed with apprehension, cementation is now completed more quickly, and isolation rarely is a problem. Since implementing this procedure, dozens of restorations have been placed with complete success by the author. Further, at 1-week follow-up appointments, patients report very little postoperative sensitivity. Long-term success, as in other procedures, will be determined only after a few years of function in the mouth.✦

Dr. Ruiz is course director of the USC Advanced Esthetic Dentistry Continuum and clinical instructor at the University of Southern California School of Dentistry. He also has been in private practice in the studio district of Burbank, Calif, for more than 13 years, with a focus on treating complex cosmetic and rehabilitation cases and occlusion. A fellow of the Academy of General Dentistry and chairman of the Dental Health Committee of the San Fernando Valley Dental Society, he also is the founder and director of The Total Dentist.com Study Club, a multidisciplinary diagnosis and treatment planning study club in California. He can be reached at (818) 558-4332.

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