



A clinical evaluation of a giomer restorative system containing surface prereacted glass ionomer filler

Results from a 13-year recall examination

Valeria V. Gordan, DDS, MS, MS-CI; Paul K. Blaser, DDS, MSD; Ronald E. Watson, DDS, MAE; Ivar A. Mjör, BDS, MSD, MS, Dr odont; Deborah L. McEdward, AS, BS, CCRP; Luis G. Sensi, DDS, PhD, MS; Joseph L. Riley III, PhD

Glass ionomer and resin-modified glass ionomer restorative materials have been used for several decades.¹ The investigators of several in vitro and in vivo studies have described the properties of these materials^{2,3} and their clinical efficacy.⁴ The main use for these materials has been related to their ability to form an ion-exchange adhesion to both enamel and dentin and their ability to release fluoride,⁵ which could inhibit the formation of secondary caries.⁴ One concern that clinicians have raised is the short-term longevity of this type of material⁶ as it relates to its weight loss and lack of physical strength.^{6,7} The material's weight loss over the years could increase the surface roughness, which in turn would make the surface of these restorations more likely to allow increased surface colonization by plaque microorganisms and, therefore, reduce the restorations' longevity.^{6,8}

The longevity of resin-based composite (RBC) materials also has been reported previously⁹⁻¹¹; it has been shown to have relatively higher failure rates than those of other materials.^{12,13} The main reasons for replacement of RBC restorations in general dental practice are secondary caries and marginal discoloration, bulk discoloration or both.^{11,12}

A new class of resin-based fluoride-releasing restorative material—called “giomer”—was developed.¹⁴ The difference between giomer and other fluoride-releasing

ABSTRACT

Background. The authors' objective was to evaluate the long-term performance of a resin-based composite restorative material (Beautiful, Shofu, Kyoto, Japan) in combination with a self-etching primer (FL-Bond, Shofu) for posterior restorations.

Methods. Two clinicians placed 61 restorations, 26 Class I and 35 Class II, in 31 patients. They placed restorations while using rubber dam isolation. Two other clinicians examined the restorations according to the modified U.S. Public Health Service (USPHS) criteria, observing color match, marginal adaptation, anatomy, surface roughness, marginal staining, interfacial staining, proximal and occlusal contacts, secondary caries, postoperative sensitivity and luster. Clinicians examined restorations at baseline as well as at one-, two-, four-, eight- and 13-year recall visits.

Results. All restorations were examined at one year, 58 (95 percent) at two years, 39 (64 percent) at four years and 41 (67 percent) at eight years; at the 13-year recall examination, 41 (67 percent) either were examined or had a known outcome. Of the 41 restorations seen at the 13-year examination, 25 restorations (14 Class I and 11 Class II) were intact and acceptable, two had secondary caries and 14 either were not present or had failed (two were missing, 10 had received crowns and two had been replaced). No changes were observed in the modified USPHS criteria for 12 of the 25 restorations that were intact (48 percent). Areas of change observed in 13 of the 25 intact restorations included color match (12 percent), marginal adaptation at the occlusal (20 percent) and proximal surfaces (4 percent), marginal staining on occlusal (24 percent) and proximal surfaces (8 percent), and interfacial staining on occlusal (4 percent) and proximal surfaces (12 percent).

Conclusion. The study results showed that most of the restorations observed at the 13-year recall examination maintained acceptable clinical qualities.

Practical Implications. Beautiful restorative material demonstrated long-term successful results for restoration of posterior teeth.

Key Words. Bonding agents; dental cavity preparation; dental materials; dental restoration; dentin-bonding agents; resin-based composites; restorative dentistry; operative dentistry; clinical protocols.

JADA 2014;145(10):1036-1043.

doi:10.14219/jada.2014.57

restorative materials is that giomer includes a surface prereacted glass (S-PRG) filler to the resin matrix.¹⁵ The S-PRG filler allows the material in release fluoride and be recharged with fluoride, which in theory makes it able to release fluoride over the long term. Materials containing S-PRG filler¹⁶ have shown superior physical properties and increased fluoride release over time¹⁷ and excellent clinical performance in short-term studies.¹⁸⁻²¹ However, long-term clinical data regarding the longevity of these restorative materials are lacking.

The bonding technology continues to be an intricate part of resin-based materials and a fundamental factor in the success of the restoration. Various generations of materials have been developed and improved through the years, with one of the improvements being the simplification of the multiple steps required for proper bonding of the restorative material to the tooth structure. One successful step toward achieving that goal was the creation of the self-etching primer, which combines the etching and priming steps.^{22,23} Studies showed a reduction in postoperative sensitivity with the use of this simplified bonding system.^{19,24}

With the number of existing restorative restorations that are replaced because of secondary caries, bulk fracture, marginal discoloration or a combination of these,^{11,12,25,26} it is important to study materials that have the potential to provide increased longevity. The creation of a resin-based material that has enhanced features, the capacity to release fluoride, and a simplified bonding system that may offer long-term clinical performance is highly desirable. Therefore, we undertook a study to evaluate the long-term performance of a resin-based restorative material containing S-PRG filler (Beautifil, Shofu, Kyoto, Japan) in combination with a self-etching primer (FL-Bond, Shofu) for posterior restorations. The specific aim was to compare the baseline results (from 1998) of restorations restored with Beautifil and FL-Bond restorative materials with the results of the same restorations after 13 years of clinical service. We hypothesized that Beautifil RBC when used in combination with FL-Bond self-etching primer would maintain satisfactory restorative properties over a 13-year period.

METHODS

Two clinicians placed 61 restorations (26 Class I and 35 Class II restorations) in 31 patients, using a resin-based restorative material that contained the giomer technology (Beautifil) in combination with a self-etching primer

TABLE 1

Composition of FL-Bond* bonding system and Beautifil† giomer restorative material.

MATERIAL	COMPOSITION
FL Primer A	Distilled water, acetone, initiators
FL Primer B	2-hydroxyethyl methacrylate (HEMA), 4-acryloxyethyltrimellitic acid, 4-acryloxyethyltrimellitate anhydride, urethane triacrylate, triethylene glycol dimethacrylate, acetone, initiators, stabilizers, pigment
FL-Bond	Distilled water, 2-HEMA, 4-acryloxyethyltrimellitic acid, 4-acryloxyethyltrimellitate anhydride, triethyleneglycol dimethacrylate (TEGDMA), urethane dimethacrylate, prereacted glass-ionomer filler, DL-camphorquinone, initiators
Beautifil	Bisphenol A-glycidyl methacrylate, TEGDMA, inorganic glass filler, aluminum oxide, silica, prereacted glass-ionomer filler, DL-camphorquinone
* FL-Bond is manufactured by Shofu, Kyoto, Japan. † Beautifil is manufactured by Shofu.	

(FL-Bond) in posterior teeth (Table 1). The clinicians placed 25 restorations in premolars and 36 restorations in molars. Eighteen patients received two or more restorations each. The patients' ages ranged from 21 to 62 years (mean age, 34 years). All patients provided written informed consent to participate in the study, which was approved by the University of Florida's institutional review board.

The clinical requirements for patient inclusion in this study were as follows:

- having a molar-supported permanent dentition that was free of any edentulous spaces and any clinically significant occlusal interference;
- requiring new or replacement Class I or II restorations in one, two or three permanent first or second molars or premolars.
- having vital teeth with a normal appearance and morphology and sound occlusal and interproximal contacts with adjacent teeth.

The clinical requirements for patient exclusion in this study were having an adverse reaction to dental materials, participating in investigation of another restorative material or system, having defective restorations opposing or adjacent to the study tooth, having evidence of parafunctional or pathological tooth wear, having rampant caries, having atypical extrinsic staining of the teeth or staining of any existing tooth-colored restorations, and having poor oral hygiene.

After the cavities were prepared with carbide burs (Brasseler USA, Savannah, Ga.), two clinicians placed the restorations according to the manufacturer's instructions and with the use of rubber dam isolation. The dentists did not use any base or cavity liners. The same clinicians finished the restorations with the use of water cooling with fine and super-fine diamond points (Hybrid Points

ABBREVIATION KEY. HEMA: Hydroxyethyl methacrylate. RBC: Resin-based composite. S-PRG: Surface prereacted glass-ionomer. TEGDMA: Triethyleneglycol dimethacrylate. USPHS: U.S. Public Health Service.

Download English Version:

<https://daneshyari.com/en/article/3136765>

Download Persian Version:

<https://daneshyari.com/article/3136765>

[Daneshyari.com](https://daneshyari.com)