

THE PERIMETER PREPARATION

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The composite restoration is the basic foundation of the general dental practice. Countless composites are placed by dentists every day. Through the science of adhesive dentistry these restorations can be conservative and provide long term service. With time and function some breakdown may occur, usually at the margin of the restoration, the interface between tooth structure and composite resin. In many cases, while the margin shows localized breakdown, the rest of the restoration remains intact. The dentist is then faced with the decision of replacing or repairing the restoration.

In the days before adhesive dentistry, when an amalgam margin began to break down, the entire restoration was soon compromised. There was no tooth-amalgam bond or seal to prevent the leakage and percolation of saliva, bacteria and bacterial products into the area under the amalgam and the adjacent tooth structure. This environment allowed bacteria to thrive, creating further breakdown and secondary caries.

With the advent of adhesive dentistry, leakage and percolation are no longer major concerns. Even in situations where the restorative margin has become defective, the bulk of the restoration is still sealed against bacterial challenge. It is, however, important not to leave these margins

open over the long term. With time, there can be further marginal breakdown and secondary decay around the “perimeter” of the restoration. The dentist should not “watch and wait” until the restoration becomes unsalvageable and must be replaced entirely. With today’s technology and materials, there are tools to “proactively treat” the situation at an early stage, before more extensive treatment becomes necessary. This approach is the **Perimeter Preparation**.

THE ULTIMATE WISH LIST

What tools are needed to repair and restore the defective margins of a composite resin restoration?

First, there must be an excisional instrument (bur) that is conservative and minimally invasive. This bur should access marginal decay with minimal tooth removal.

Second, the restorative material must flow easily into all the irregularities of the Perimeter Preparation. The typical preparation is very narrow. It may also be long and convoluted, following the defects at the margins of the restoration and the surrounding tooth. The dental material of choice is a flowable composite resin which can easily penetrate the intricate geometry of the narrow preparation without bubbles or gaps. The ideal material should have strength and wear resistance to withstand all oral forces. It must

be radiopaque to allow for monitoring of treated sites. Additional features to this ultimate wish list are plaque resistance and remineralizing properties, to prevent future perimeter breakdown.

The ultimate wish list is no longer dental science fiction. These tools, materials and techniques are available as discussed below.

FISSUROTOMY BUR

The Fissurotomy Bur System (SS White Burs, Lakewood NJ) was developed to proactively detect and remove incipient decay in enamel (Fig. 1). The shape and size of the Fissurotomy bur are designed specifically for treating early pit and fissure lesions. The head length is 2.5 mm, allowing the dentist to control the bur tip to cut just below the DEJ and no further. The tapered shape of the bur allows the cutting tip to encounter very few dentinal tubules, and to minimize heat build-up and vibration. This has the added advantage of decreasing patient discomfort and the need for local anesthetic. Traditional cutting burs remove far more enamel at any depth of cut and are far more invasive.

The Fissurotomy bur is also the ideal excisional tool for the Perimeter Preparation. It is conservative and minimally invasive. It can access decay with little tooth removal. The Fissurotomy bur is the proactive tool for the repair of defective composite restoration margins.



FIGURE 1—The Fissurotomy bur (SSWhite) is designed to conservatively remove incipient decay in enamel.



FIGURE 2—Beautiful Flow Plus (Shofu) combines the “healing” of giomer science with the handling and adaptability of flowable composites.



FIGURE 3—The occlusal margins of a composite restoration have begun to break down.



FIGURE 4—A Fissurotomy bur (SSWhite) removes all decay and questionable tooth material.



FIGURE 5—The Perimeter Preparation is examined for any remaining decay.



FIGURE 6—Microabrasion is used to improve bondability of the preparation.

GIOMER FLOWABLE RESTORATIVE MATERIALS

Giomers (Beautiful II, Beautiful Flow Plus, Shofu, San Marcos CA) are the latest category of hybrid restorative materials. Giomer technology represents the true integration of glass ionomers and composite resins with the benefits of both. Giomers provide the fluoride release and recharge of glass ionomers and the esthetics, physical properties and handling of composite resins.¹

Studies show dentin remineralization occurs at the preparation surface adjacent to the giomer.² Further, giomer restorations take up the extra fluoride ions released by fluoride toothpastes, rinses and varnishes in oral fluids. The giomer restorations then function as reservoirs when fluoride is needed in the oral cavity.^{3,4}

Giomer restorations resist plaque formation due to a film that forms on the restorative sur-

face when it contacts saliva. This film consists of aluminum, silica, strontium and other ions that originate from the giomer fillers and act to inhibit bacterial adhesion.⁵

Giomer flowables (Beautiful Flow Plus, Shofu, San Marcos CA) have recently been introduced (Fig. 2). They combine all the “healing” advantages of giomer science with the ease of use, handling and adaptability of flowable composites. The physical performance (compressive strength, wear resistance, etc) of Beautiful Flow Plus has been tested against leading hybrid composites and has been found to be equal or better. Beautiful Flow Plus is also radiopaque.

Beautiful Flow Plus is the ideal restorative material for the Perimeter Preparation. It fulfills all the necessary criteria: a flowable composite resin which easily conforms to the intricate

geometry of the narrow preparation without creating voids, has strength and wear resistance to withstand oral forces, is bacteriostatic and remineralizing to prevent secondary caries, and is radiopaque.

The tools and materials for the Perimeter Preparation are now readily available and so is the simple technique that can be incorporated into daily dental practice.

THE PERIMETER PREPARATION TECHNIQUE

1. The occlusal margins of a composite restoration have begun to break down. There is no radiographic evidence that decay has spread far beyond the surface (Fig. 3).
2. All decay and questionable tooth material are removed with the Fissurotomy bur (Fig. 4).
3. The Perimeter Preparation is examined for any remaining decay (Fig. 5).



FIGURE 7—Beautibond (Shofu) 7th generation adhesive is applied to the cavity preparation.



FIGURE 8—The adhesive is thoroughly air-dried.



FIGURE 9—The adhesive is light cured.



FIGURE 10—Beautiful Flow Plus (Shofu) is placed in the Perimeter Preparation and light cured.



FIGURE 11—The completed Perimeter Restoration will now serve the patient effectively for many years.

4. Microabrasion can be used to increase the surface roughness and bondability of the preparation (Fig. 6).
5. Shofu Beautibond 7th generation adhesive is applied to the cavity preparation (Fig. 7).
6. The adhesive is thoroughly air-dried (Fig. 8).
7. A brief 3-5 seconds of LED light curing is all that is required for the adhesive (Fig. 9).
8. Beautiful Flow Plus (Shofu) is placed in the Perimeter Preparation and light cured (Fig. 10).
9. The completed Perimeter Preparation technique offers a res-

toration that will serve the patient effectively for many years (Fig. 11).

The Perimeter Preparation is an effective treatment option for Proactive Intervention Dentistry. The dentist has the tools, materials and techniques to manage restorative marginal breakdown at an early stage, before more extensive treatment becomes necessary. This is simpler and more predictable for the dentist, as well as more comfortable and less invasive for the patient.

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Dr. Goldstep sits on the Oral Health Editorial Board (Healing/ Preventive Dentistry), has served on the teaching faculties of the Post-graduate Programs in Esthetic Dentistry at SUNY Buffalo, the universities of Florida (Gainesville) and Minnesota (Minneapolis). She has lectured nationally and internationally on healing dentistry, lasers, dentist health issues and office design. Dr. Goldstep is a consultant to a number of dental companies, and maintains a private practice in Markham, ON. Oral Health welcomes this original article.

REFERENCES

1. Koirala S, Yap A, A Clinical Guide to Direct Cosmetic Restorations with Giomer, Dental Tribune International, 2008
2. Miyauchi T et al, The effect of Giomer restorative materials on demineralized dentin, 2010, IADR Abstract 135006
3. Dhull KS, Nandlal B, Comparative evaluation of fluoride release from PRG-composites and compomer on application of topical fluoride, Journal of Indian Society of Pedodontics and Preventive Dentistry, 2009;27:1:27-32
4. Okuyama K, et al, Fluoride release and uptake by various dental materials after fluoride application, Am J Dent, 2006;19:123-127
5. Shimazu HondaT, Yamamoto K et al, Study on the film substance produced from S-PRG filler, JJ Conser Dent, 2002;45(Autumn):42

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