In Practice

WITH DR. RONALD E. GOLDSTEIN

How Do You Choose Materials: Direct Composites and Indirect Composites?

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Although the emphasis in the past decade has been on technology involving porcelain laminate veneers, direct composite bonding is alive and well. Dentists continue to depend on direct bonded composite resin as their restoration of choice for anterior and for many posterior restorations. To help clarify the issues surrounding composite resins and to see just how useful they are in today's practice, I have sought the participation in this symposium of some of our leading dentists. There is no doubt in my mind that for the next decade we will continue to see increased use of direct bonded restorations in everyday dental practice as the most conservative, esthetic, and hopefully long-lasting restoration in the esthetic restorative practice.

Q: What do you consider are the indications for direct composite resins?

Alan A. Boghosian, DDS—From an ideal perspective, the indications for direct placed composite remain similar to the indications for amalgam usage; conservative restorations are obviously likely to survive longer than larger restorations. Very conservative restorations can be placed with bonded composite, allowing for the preservation of healthy tooth structure. In non-ideal situations, such as restoring a devastated tooth where the periodontal health or economic conditions might preclude the placement of a full coverage restoration, direct bonded composite can be used. The goal is to extend the useful life of a tooth. Any means, ideal or not, would be better than loosing a tooth.

John Kanca III, DMD—This is a tough question with no easy answer. It is my experience that direct resins can do almost anything and be quite durable. I prefer ceramic veneers as I know they will not change color; specifically, they will not decrease in value over time. I have placed many direct resin veneers and some have survived for 20 years, but have exhibited some minor color changes. The incisal edges will also show some degree of wear. I tend to place either direct resins or full coverage in the posterior. It is likely that we all would agree when it is time to place some kind of full cuspal coverage but often economic factors dictate that one must make do with less than the so-called "ideal" choice.

Jeff Brucia, DDS—The most important criteria for any composite are technique and material knowledge of the operator. I see many failing restorations because of operator error. With excellent adhesive application, composite placement, and curing technique, long-term success can be achieved with most small to medium restorations that have all cavosurface margins on healthy etched enamel. Anterior and posterior indications can include caries removal and replacement, traumatic injury and fracture treatment, strengthening of unsupported or weakened remaining tooth structure, conservative esthetic changes, and trial changes before correction with indirect materials. Direct composites may also be considered short term for larger restorations when finances are not available for more ideal treatment options.

Anita L. Tate, DMD—Direct composite resins are indicated in the treatment of the space discrepancy, multimedia case of crowns, veneers, and bonding. This provides a conservative approach for this type of case with spacing up to 2 mm of missing tooth structure. Direct composite resins are indicated and useful for teeth that require restoration of one to two surfaces if the contact is not the centric stop or main supporting cusp. I have found direct composite resins useful in testing occlusal function. I use direct resin on the lower incisors as a transition when opening the vertical dimension of a planned veneer case. This allows me to "resin road test" the case before completion and avoid the challenges of the veneer provisional.

Q: What do you consider are the indications for indirect composite resins?

Alan A. Boghosian, DDS—Indirect composite restorations are best indicated when the size of the restoration becomes too large to achieve proper contours, margins, contacts, and esthetics with direct composite. To a large degree, the criterion for use of indirect composite is dependant upon the capabilities of the dentist.

John Kanca III, DMD—I do not choose to do any. There really is no data to suggest that indirect resins perform any better than direct resins.

Jeff Brucia, DDS—A well-fabricated indirect resin restoration can demonstrate greater physical properties than a directly placed restoration because of its higher conversion potential. This creates opportunity in the posterior region when restoration size has increased to include most of the occlusal surface with extensions to the proximal or side surfaces of the tooth. Caution should be used when occlusal forces are of concern in the posterior area. Wear and functional stability have been shown clinically to be an area of concern. Conservative anterior indirect resin restorations such as veneers can work well, but the area of concern here is polishability and staining. One advantage is easy repair when needed.

Anita L. Tate, DMD—I consider the amount of tooth loss, the functional aspect, the quality of enamel, and the age and wear factors of the tooth. If the tooth

has more than 65% tooth loss to filling material or decay, I consider full coverage. Indirect composite resins are indicated as a conservative restoration when good quality enamel is present.

Which do you prefer for posterior restorations for your patients, indirect or direct composite resins?

Alan A. Boghosian, DDS—I absolutely prefer direct composite for intracoronal restorations; if the clinical situation is appropriate. They tend to be more conservative and can be completed in one appointment.

John Kanca III, DMD—Direct. Once again, there is no clinical data to suggest that indirect materials perform any better than direct materials. I have many large direct restorations that are lasting 18 to 20 years. That is a success by any measure.

Jeff Brucia, DDS—Direct posterior resin restorations perform well when the size of the preparation is small to medium. Ideally resin restorations should have complete etched enamel margins. When extensions are beyond enamel and ideal material selection is not an option, direct placement can provide an opportunity for the sandwich technique with a glass ionomer seal in the deeper areas. Indirect resin restorations are an option when proximal extensions are extensive and greater strength is required. Indirect resin restorations have been shown to provide superior fracture resistance than their direct counterpart has.

Anita L. Tate, DMD—My selection is made on a tooth-by-tooth basis. If the tooth has less than 50% tooth loss, good enamel, and sound occlusion, I select direct composites. If the tooth has challenges of function, wear, and minimal enamel present, I select some form of indirect restoration. However, my thought process is now challenged because of the success of some of the new hybrid restoration products. I am testing the way I think about composite bonding in general. Direct resins are more esthetic, stronger, more conservative, and easier to place than they were in the past. Therefore, I have recently used direct resins to restore teeth more so than I have before. [QA. Edits okay?]

Does polishability enter into your decision-making?

Alan A. Boghosian, DDS—The entire purpose of using composite is to mimic natural tooth structure and to achieve an esthetic result. In my opinion, polishability (more importantly retention of polish) is an important issue. However, manufacturers should not compromise the physical properties of a composite just for the sake of improving esthetics. This would be a step backwards, especially in posterior applications. The challenge is to raise the bar of the physical properties and improve the optical characteristics of tooth-colored restoratives.

John Kanca III, DMD—Yes, but fortunately a characteristic of most resin composites today is a good polish. It is found on all microhybrid type resin composites, and these types of composites can be used in both the anterior and the posterior dentition.

Jeff Brucia, DDS—Yes. Both chairside polishability and durability of the polish are important for resistance of stain and plaque accumulation. Many materials can achieve a high polish during the clinical procedure, but few maintain that polish for long periods of time.

Anita L. Tate, DMD—Yes, the polishing process is a factor. It takes time and multiple steps to complete a great restoration. If the procedure takes too long, indirect resins are more of a preference. I have found that a good polish with a resin sealer works nicely. Something like Fuji Coat LC made by GC America Inc provides a laboratory-like finish.

Which do you feel lasts longer, indirect or direct, and how long do you predict for your patients the life expectancy for each of these types restorations?

Alan A. Boghosian, DDS—The physical properties of both direct and indirect composites, for the most part, are clinically more similar to each other than when either is compared to metals and ceramics. I would never choose to place an indirect composite when I can successfully place a direct restoration, especially in conservative situations. A properly placed direct composite restoration preserves more tooth structure, is more economical for the patient, and requires the use of fewer materials and procedures. Some indirect composite systems do increase physical properties by as much as 15% compared to direct composite. This 15% increase can have an impact on restoration longevity, especially with larger restorations. No matter what composite modality is used, the most important consideration for achieving clinical success is using proper clinical technique.

John Kanca III, DMD—I do not think it matters. I think both will prove to be quite durable. As I mentioned, I have many direct restorations that have lasted up to 20 years. In terms of cost-benefit, this is hard to beat. No one has shown any superiority of indirect resins over directs. Directs might require slightly more effort to place, but one is saved the need to make a temporary. One is also saved from a second appointment and a second injection. That indirect does not fit or breaks is always a possibility. I believe that directs are far more desirable.

Jeff Brucia, DDS—There of several factors that must be evaluated when considering life expectancy of these resin restorations. Because of its higher conversion percentage, the indirect restoration will be stronger. But for a small restoration, I do not believe it will out perform a direct restoration. I still see some of my father's resin restorations holding up at 30 years. As the restoration size increases, the greater physical properties will improve the restoration's chances to hold up to all the damaging forces that may be applied to it. Risk factors should always be considered. The life of a small resin restoration placed in an ideal environment may last more than 20 years, but this number changes quickly when you consider placement technique, pH of the mouth and caries risk, occlusal forces and grinding habits, opposing material, and overall size and depth on the restoration. A resin restoration may only perform well for little more than 1 year and should therefore be replaced with a different material option.

Anita L. Tate, DMD—I think they have the same life if the occlusal and tooth structure is appropriate for the resin selected. Since the microhybrids are relatively new in the marketplace for actual clinical trials, they look great but need more time for long-term clinical assessment.

Do you have one or more manufacturer's product that you prefer using?

Alan A. Boghosian, DDS—For direct restorations, there are several excellent microhybrids to choose from. New composites constructed with nanoparticles, such as Filtek™ *Supreme* (3M ESPE), offer improved esthetic characteristics. The unique nanoparticle construction of Filtek™ *Supreme* possesses physical properties comparable to other commercially available composites while providing good esthetics and outstanding retention of polish. Having evaluated many materials in clinical trials, I have yet to observe any composite capable of maintaining the long-term enamel-like luster found when using the translucent shades in Filtek™ *Supreme*. Regarding indirect restorations, belleGlass™ HP (Kerr Corporation) is at the top of my list. Under the direction of Al Kobashigawa, a senior scientist at Sybron Dental Specialties, the physical properties and esthetics of belleGlass™ have been steadily improving over the years. From the unique composition of the composite to the heat with pressure processing of the restoration, belleGlass™ has excelled in laboratory studies as well as in clinical trials.

John Kanca III, DMD—I use a variety of materials; Filtek™ *Supreme* from 3M ESPE, Simile® from Pentron® Clinical Techno-

logies, LLC, Venus™ from Heraeus Kulzer, Inc are among them, but I have to say that my favorite is Vit-l-escence® from Ultradent Products, Inc. [QA. Why?]

Jeff Brucia, DDS—No. Most of the products that are presently available show good results both in vitro and in vivo. I do find that placing microfill composite as the final increment will maintain the polish, help with wear, retain less plaque, and stain less than most of the larger particle size products. Materials such as Heliomolar® (Ivoclar Vivadent®, Inc) and Renamel® (Cosmedent, Inc) have passed the test of time. Indirect products such as Concept™ (Ivoclar Vivadent®, Inc), Sinfony™ (3M ESPE), and belleGlass™ have worked well in my practice.

Anita L. Tate, DMD—Yes. I use GRADIA DIRECT® (GC America Inc) for its ease of handling and optical properties and Esthet•X™ (DENTSPLY Caulk) for its translucency. If indicated, I often mix products if I need specific color or characteristics.

How often do you use a base under your posterior composite restorations and which one do you prefer?

Alan A. Boghosian, DDS—I never use a base under direct placed composite restorations. I do use resin modified glass ionomer materials, such as Fuji II LC (GC America Inc) or Vitrebond™ (3M ESPE), as a base to establish a uniform pulpal floor and to block out undercuts on indirect restorations. These self-adhesive materials are biocompatible and do an excellent job of sealing dentin.

John Kanca III, DMD—I never use a base of any kind. I use the self-etching bonding system Simplicity™ (Apex Dental Materials, Inc) and apply a thin layer (0.5 mm) of a low viscosity flowable composite (PermaFlo®, Ultradent Products, Inc). My patients rarely have any postoperative sensitivity. It is a fabulous combination.

Jeff Brucia, DDS—More often now than ever. Research continues to demonstrate that as the quality of intertubular dentin decreases, the less the potential is for a seal and bond with resin materials. Deep dentin presents significantly less bondable surface area than does shallow dentin. Sclerotic and affected dentin also can generate lower quality adhesive strength and caries resistance. Many of the newer trends in adhesives are raising questions and concerns about the quality and longevity with many in vivo conditions. I believe there is a growing need for considering a base placement as you evaluate the dentin quality and adhesive potential. The material of choice today would be a glass ionomer or resin modified glass ionomer.

Anita L. Tate, DMD—For restorations that are deep or with fracture lines, I use the sandwich technique of glass ionomer. Since GC America Inc has been the leader in glass ionomer materials; I use their products for insulation, for decay prevention, and as a base for resin bonding. ○