



Figure 1: 10.0X loupes to add to an updated armamentarium

spanning more than 30 years of research, have resulted in a tangible and sustainable development for the restorative practitioner. To date, the only way to restore a tooth with authentic enamel and dentin is to recycle wisdom teeth in a structured innovative process including a CAD/CAM machine.⁵ The method is elegant and inspired by the biomimetic principle, using resin bonding as a cornerstone. Many colleagues have used the label “biomimetic dentistry” for marketing purposes, but how many understand the

real meaning of the term? For a clinician to have a truly BRD-driven practice, it implies the following tenets:

- **Being passionate about and in love with the natural dentition,** and regarding intact unrestored teeth and their natural design as the absolute model to further the rumination and understanding of biology, morphology, mechanics, and function.
- **Striving for the sole elimination of the diseased tissues and absolute maintenance of healthy tissues,** unlike traditional prosthetic approaches that endorse substantial sacrifices of healthy enamel, dentin, and even the pulp in some instances, in the name of retention and resistance form.
- **Becoming an expert “bondodontist,” using proven adhesive protocols,** and abandoning all concepts based on retention- and resistance-form principles because less is more. In other words, using direct, semi-(in)direct, and indirect adhesive restorations in combination

with composite resins, fiber-reinforced materials, and etchable ceramics, depending on the size of the restorations and complexity of the given case.

- **Making use of all updated armamentaria, materials, products, and methods that favor minimally invasive approaches:** visual aids, magnification, electric and oscillating handpieces, gold standard dentin bonding agents, additive contours, immediate dentin sealing, deep margin elevation, thermo-modified luting, etc. (figure 1).
- **Making every decision based on the four essential elements:** science, common sense, experience, and the patient.

I have lectured extensively on these topics for the past 30 years, and I’ve seen older colleagues who felt discouraged with our profession come back to life with a newfound passion, feeling refreshed and renewed with love for restorative dentistry because of BRD. I encourage our young

The biomimetically driven restorative dental practice

Pascal Magne, DMD, MSc, PhD

I REMEMBER WHEN I GRADUATED FROM DENTAL SCHOOL in 1989, I was not impressed with the current techniques and armamentarium; amalgam restoration, cast post and core, and crown and bridge were not particularly appealing to me. These approaches simply did not feel right to me. I profoundly questioned my career path and contemplated my future as I was completely unsatisfied with my clinical performance, which at the time employed these traditional techniques and resulted in sound yet ordinary and unsatisfactory clinical outcomes.

I was becoming increasingly discouraged and disappointed and was ready to abandon my professional path when I was given the opportunity to work with two master ceramists—Claude Sieber in Basel, Switzerland, and my brother Michel, who opened his own laboratory in 1992 in Montreux, Switzerland.

Concurrently, I discovered there was another way, something radically different that would require quite a leap of faith. In 1984, an article impacted me like a gospel for the biomechanics of the tooth—“Cusp

reinforcement by the acid-etch technique” by Morin et al.¹ It demonstrated that bonding to enamel alone was able to reinstate cusp rigidity in a way that would allow me to reinforce the tooth without invasive preparation. This was immediately followed by the realization that adhesive dentistry combined with the mastership of a dental ceramist was a monumental recipe and in retrospect, was going to shape and alter the next 10 years of my career. It culminated with a PhD and my first book, *Bonded Porcelain Restorations*, in 2002.²

TODAY’S DENTISTRY MUST BE DRIVEN BY BRD

Skipping forward, today we’ve all heard about esthetic dentistry, cosmetic dentistry, adhesive dentistry, minimally invasive dentistry, and the numerous labels describing the discipline of modern restorative dentistry. There is one universal label, however, that encompasses all others because its core definition is foundational to the others: biomimetic restorative dentistry (BRD).^{3,4} This is “using synthetic methods and materials to mimic a model, a true reference, one that does not change nor evolve with time.”^{3,4}

This model is the dental archetype, the intact natural tooth. There have been numerous attempts to mimic biochemical processes via stem cell research and molecular biology, but none of these efforts,

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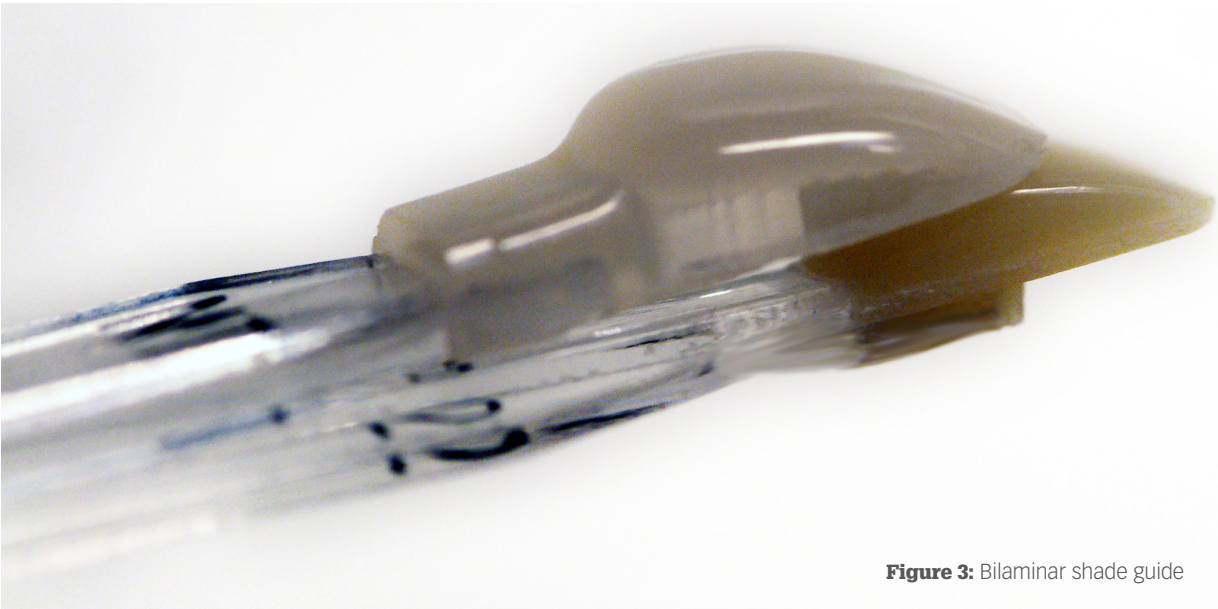


Figure 3: Bilaminar shade guide

colleagues to sync their dental heartbeat with BRD and find a mentor, a true dental “parent,” who will accompany them through their career. That was the case in my life with Professor Urs Belser at the University of Geneva, my alma mater,

Professor Bill Douglas at the Minnesota Dental Research Center in Biomaterial and Biomechanics, where I did my PhD research, and my brother, Michel, who has taught me everything about dental technology and ceramics.

My 2002 book with Professor Belser, *Bonded Porcelain Restorations, a Biomimetic Approach*, focused on the use of bonded porcelain restorations (figure 2).² I always considered this the most biomimetic restorative treatment in the sense that the beautiful porcelain veneers crafted by a master ceramist are almost permanent and ageless. The work demonstrated that the application of bonded porcelain restorations could be largely expanded based on new bonding protocols, such as the immediate dentin sealing technique and the use of restorative materials as luting agent.

The first two decades of the millennium were marked by numerous developments that made BRD more inclusive and accessible. Direct composite resin restorations have been streamlined in their color matching approaches and application methods. Bilaminar shade guides, single-hue dentin masses and the natural stratification technique, matrices and separation ring systems, various novel sandwich approaches with low-shrinkage materials, and novel short-fiber-reinforced composite resins represent some of the precepts of this progress (figure 3).

Our latest works, titled *Biomimetic Restorative Dentistry, Volumes 1 and 2*, reflect on this evolution and review all the materials and protocols needed for

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Figure 2: Dr. Magne and Belser’s popular books about BRD

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BIOMIMETIC

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dentists who want to reignite their love for the profession with a fresh perspective regarding restorative approaches.^{3,4} Throughout my professional journey, I've been influenced and encouraged by many colleagues, and I can recommend that you too, seek inspiration from this amazing community: the bio-emulation think tank group, the Academy of Biomimetic Dentistry, and the American and European Academies of Esthetic Dentistry, among others. I have seen my students go from mentees to mentors with the successful application of BRD. The rewards of this practice are priceless and encouraging.

To a skeptic, endorsing BRD is initially somewhat counterintuitive due to the meticulous BRD protocols (thorough, rigorous, intricate, precise, and gradual practices) that often go against the current trends of the dental world market (overpromising simplified, convenient, cheaper, and faster practices). According

to Romans 12:2: "Do not conform to the pattern of this world but be transformed by the renewing of your mind." I am hoping that BRD will have this renewing effect on you, your team, and your practice. God bless you. **DE**

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INTELLIGENT HYBRID RESTORATIONS

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A COMBINATION TECHNIQUE

Thankfully, developments in glass ionomer's chemistry have coincided with significant improvements in bonding techniques. A short while ago, I was introduced to the IDS technique, the efficacy of which made me rethink my skepticism of composites. IDS was the missing link for a restoration design that needed structural durability along with a chemistry-based defense. With it, I realized that I could get the best of all three materials—combining the anticaries properties of the glass ionomer, the superior bonding capabilities of IDS, and the strength of a ceramic resin hybrid.

The result is what I consider an amalgamation of the co-cure technique, the sandwich technique, and modern composite bonding. The benefits of combining these techniques are multifold. CEREC technology allows the creation of an

indirect restoration right in the office in about 10 minutes; CeraSmart doesn't need to be fired and polishes chairside in minutes. My patients can watch the CEREC machine fabricate their computer-designed tooth, and I'm confident that the glass ionomer is protecting the tooth under my restoration and will slow future cariogenic attacks.

I've always been a "cariologist" at heart. I used to say, "If I can't fix a tooth with glass ionomer, I'll fix it with resin-modified glass ionomer. And if I can't fix it with resin-modified glass ionomer, I'll lay hands on you and pray." I haven't said that in quite a while with my newfound appreciation for what my composite-loving colleagues have been touting for some time. I never thought I'd use CEREC, and I never thought I'd write about my use of composite bonding. But combining those technologies with glass ionomer has produced undeniably successful results in some extreme-carries-risk patients. I've

found peace of mind is in my patient's caries-resistant and CEREC-restored piece of mouth.

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