***Dr. Pascal Magne** is a globally recognized leader in biomimetic restorative dentistry. He earned his Med Dent degree from the University of Geneva in 1989, followed by a Master in 1992 and a Ph.D. in 2002. A former tenured professor at the University of Southern California's Herman Ostrow School of Dentistry, Dr. Magne has authored over 120 peer-reviewed publications and co-authored the seminal textbook Bonded Porcelain Restorations in the Anterior Dentition – A Biomimetic Approach (Quintessence Publishing 2002) and the two additional bestseller books Biomimetic Restorative Dentistry (2022). He is currently the Director of Magne EDUCATION at the Center for Education and Research in Biomimetic Restorative Dentistry (CER BRD), where he continues to shape the future of esthetic and conservative dentistry through education, research, and innovation.*

Short fibers, long-term vision: Tooth survival as biomimetic priority

An interview with **Dr. Pascal Magne,** USA

In this exclusive interview, we delve into the visionary world of biomimetic dentistry with Dr. Pascal Magne, a pioneer in the field and a global authority on adhesive techniques and aesthetic excellence. He is an inspiration for clinicians worldwide through his research, teaching, and clinical artistry. Known for his visionary approach to minimally invasive dentistry, inspired by the natural structure and function of teeth, Dr. Magne shares his insights into the evolving role of fiber-reinforced composites (FRCs) within the biomimetic realm. His perspective bridges decades of academic research and clinical innovation, offering a compelling look at how modern materials can support minimally invasive, long-lasting dental care.

What inspired your passion for biomimetic dentistry, and how has your philosophy evolved over the years?

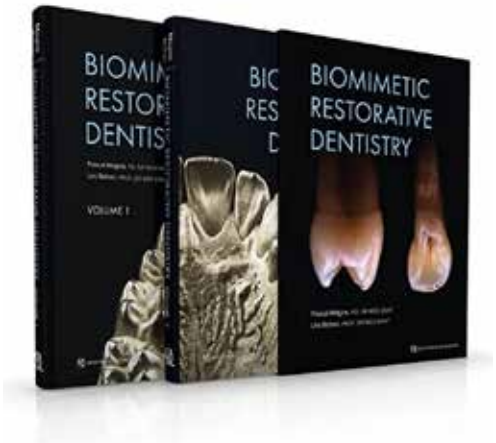
Dr. Magne: I graduated in 1989 and joined the University of Geneva as a faculty member in both Prosthodontics and Operative Dentistry. Early on, I was drawn to restorative dentistry, influenced by my brother Michel, a master ceramist. His passion and connections in the world of aesthetics inspired my shift toward prosthodontics, though initially I struggled with the quality of traditional lab work and the limitations of early composite techniques.

Everything shifted in 1992 when Michel launched his own lab, giving us the opportunity to collaborate – blending his ceramic artistry with my deepening passion for adhesive dentistry. We taught ourselves how to bond ceramics, inspired by publications by Calamia, Horn, Simonsen. Others authors, such as Andreasen and Walls inspired me to start treating severely damaged teeth with bonded porcelain restorations instead of traditional crowns.

Encouraged by my mentor Professor Belser, we continued innovating within the University of Geneva. As our

confidence in bonding grew, techniques like immediate dentin sealing and deep margin elevation emerged. In 1995, we began using restorative composites as luting agents and expanded our indications to full-mouth cases.

After validating our concepts in Minnesota with my research mentor Dr. William Douglas, we published our book on Bonded Porcelain Restorations in 2000[1] - at the same time that I finished my PhD on the same topic. In 2004, I was recruited by Dean Harold Slavkin (University of Southern California, USC) to teach biomimetic concepts, which led my family to move to Los Angeles. During my time at USC, my focus transitioned toward composite resin restorations. Around that time, I connected with Dr. Niek Opdam from the University of Nijmegen, who advocated for large direct composites. His 2010 study showing 12-year success rates of direct composites outperforming amalgam was eye-opening[2]. Composite resin is inherently biomimetic—it mimics enamel's wear resistance and dentin's flexibility. But what was missing was the fracture toughness of dentin. That's when everX came into the picture, offering fiber reinforcement that finally bridged that gap. This fiber reinforced composite (FRCs) is one of the most exciting developments in recent years and a true game changer in mimicking dentin more effectively.



You've often emphasized the importance of preserving the tooth over the restoration. Could you elaborate on how this philosophy influences your material choices?

Dr. Magne: My shift toward biomimetic dentistry began with my early experiences as a prosthodontist. I saw firsthand how traditional restorations– cast post-and-core and crowns – often failed catastrophically after several years, even when done with great care. That is, the restoration held up, but the tooth failed. These failures, especially root fractures that made teeth unrestorable, deeply affected me. It was frustrating to see excellent dentistry still result in tooth loss.

That led me to question the materials and methods we were using. Zirconia, for example, is strong and widely used. We need to be careful when using extremely strong materials because they can transfer stress deeper into the tooth, increasing the risk of root fractures. Biomimetic dentistry, on the other hand, taught me that restorations should be allowed to fail in a way that protects the tooth – not the other way around.

I also started paying more attention to antagonistic wear. While we often worry about our restorations wearing down, we rarely consider the damage they cause to opposing teeth. Porcelain and glass ceramics are beautiful but harsh on enamel. Composite resin, on the other hand, wears more itself but is much gentler on the opposing enamel. That's why, especially in posterior restorations facing natural teeth, I prefer composite – it's simply more tooth-friendly.

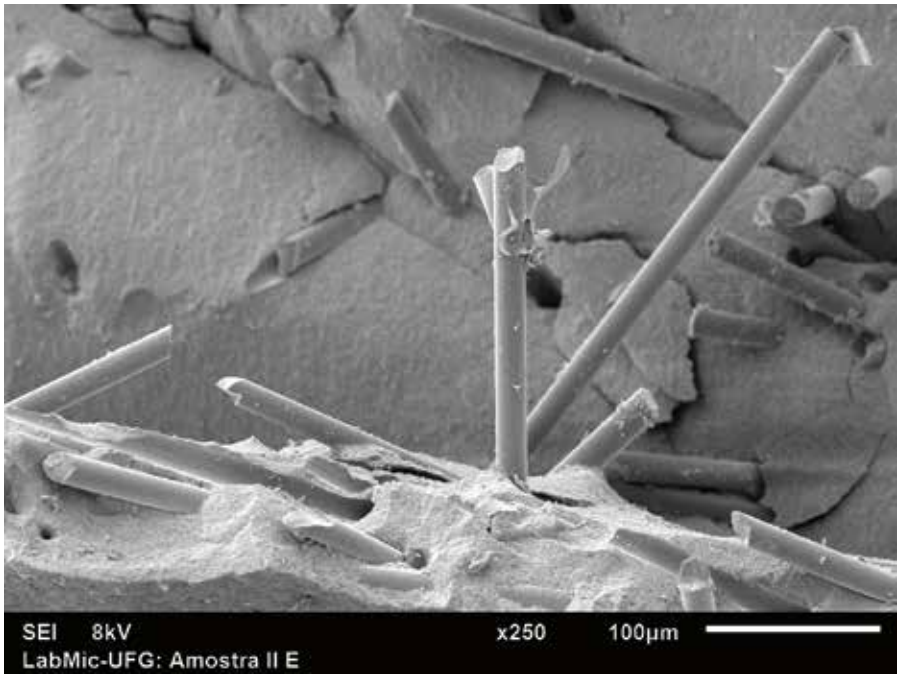
Nowadays, are you placing more ceramics or more composite restorations?

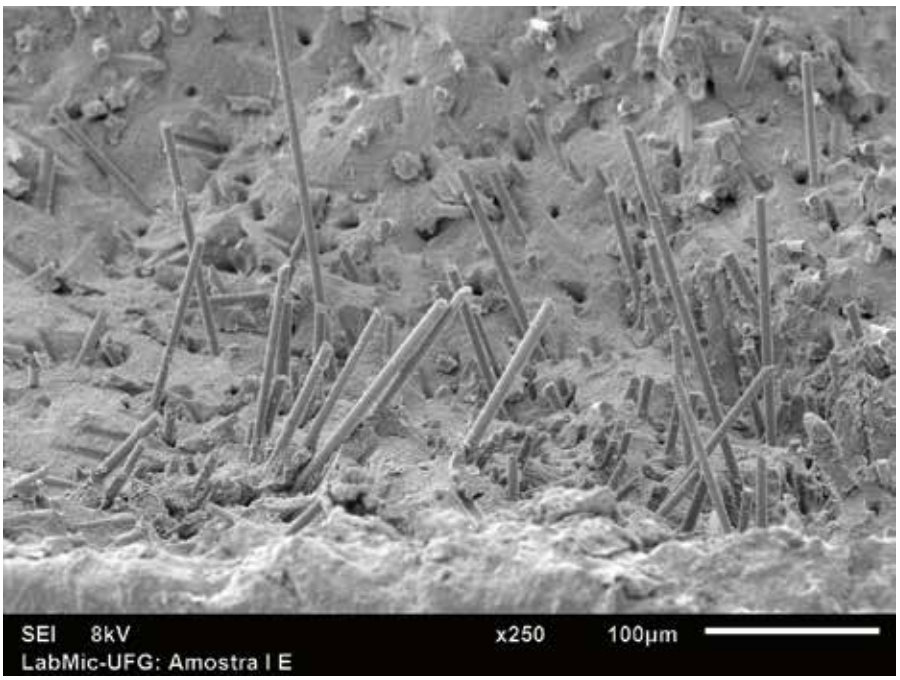
Dr. Magne: Let me start by saying this: well-executed bonded porcelain restorations are certainly the most aesthetic and long-lasting treatment.

But they remain more expensive and slightly less conservative than direct restorations. Ceramic veneers also require collaboration with a master ceramist and laboratory. These elements may constitute significant limitations for some clinicians or patients.

On the other hand, composite resin is truly the daily bread of dentistry. It's such a versatile material and as a single material, maybe the most biomimetic material by nature because of the combination of wear resistance and flexibility, resilience. It actually broke my heart recently when a former student told me he doesn't do any direct composites at all. Some dentists prefer to rely on lab work or CAD/CAM systems, avoiding the effort it takes to master direct techniques. But that's a missed opportunity – there's so much we can achieve with direct composites.

It depends a lot on location and culture, but I have seen many dentists shy away from composites simply because they haven't invested the time to learn them properly. Personally, I've had quite a bit of dental work done when I was younger, but not a single ceramic restoration in my mouth. Everything is direct or semi-direct composite, replacing old amalgams, and they've held up beautifully and were mostly done by previous students of mine! They can be refurbished every 10–15 years, when necessary, and I've never "lost a pulp". And that's the key – preserving tooth vitality. Once a tooth loses its pulp, it's compromised. Keeping that tooth functional for the rest of a patient's life becomes a constant battle. So, for me, it's all about protecting the tooth, not just creating a strong restoration.





What are the most critical clinical steps to ensure optimal performance when using FRCs in direct restorations?

Dr. Magne: I believe simplicity is key. That's why I prefer fiber-reinforced composites as reinforcement. Ease of placement is essential, not just for clinical efficiency but also for broader adoption of any new material or technique.

From a structural standpoint, I value the isotropic behavior of the material. The fibers are randomly oriented, which means the material resists stress equally in all directions. To preserve that property, I believe it's important not to layer or pack it too much but to place it in a large increment.

So overall, everX offers a combination of simplicity, efficiency, and performance that really fits the biomimetic philosophy.

What role does fiber orientation and length play in the performance of FRCs?

Dr. Magne: A high fiber aspect ratio– which is the ratio of fiber length to

diameter– is critical[3]; if this ratio is too low, it will function as a regular filler. In this regard, everX Posterior contains short E-glass fibers with an aspect ratio within or close to this optimal range. These fibers are long enough to exceed the critical fiber length (around 0.5–1.6 mm), allowing them to effectively bridge cracks and reinforce the restoration. It is truly providing bulk strength – especially when placed in bulk, the short fibers are randomly oriented to provide uniform reinforcement in all directions, which is ideal for dental applications where stress comes from multiple angles.

Do you foresee FRCs becoming a standard in posterior restorations, or do you believe their use will remain case-specific?

Dr. Magne: If we talk about large direct posterior restorations, I believe everX should become the standard. In these cases, we need the added strength and durability it offers. I'm particularly impressed by its stress-reducing effect, especially when placed in bulk[4]. So, in short – absolutely, it's a material I strongly support for these indications. It is also a very good "no-post" buildup materials for inlays, onlays and crowns as illustrated in other works that we published[5,6].

What developments or innovations in biomimetic materials are you most excited about in the next 5–10 years?

Dr. Magne: What excites me most right now is the transformative potential of digital dentistry and 3D printing in dentistry. It's still developing, but I believe it will revolutionize how we work. Currently printed restorations are still weak but we're already seeing progress with printable resins reaching higher filler content, and I'm hopeful we'll soon see materials approaching 80% filler content and why not short nanofibers?

Ceramic printing is another exciting area. A new system now allows for printing lithium disilicate restorations – an impressive step forward, even if the technology isn't widely accessible yet.

I'm very interested in new evolutions in FRCs in general. Research from Turku on hybrid FRCs – combining large and small fibers – showed great promise[7]. Imagine printable FRCs, CAD/CAM blocks, or even fiber-reinforced cements. That's the kind of innovation I believe will shape the next decade in restorative dentistry.

If you could redesign dental education from scratch, what would you prioritize to prepare students for the future of biomimetic dentistry?

Dr. Magne: Biomimetic restorative dentistry, to me, is a fully integrated discipline—and I believe it should be introduced from day one in dental school. This early exposure is crucial. Take morphology, for example– many students struggle to see its relevance. But when you frame it through the lens of biomimetics, where shape equals function, mechanics and aesthetics, it suddenly makes sense. Biomimetic dentistry is about preserving biology– keeping the pulp alive– then restoring function, and finally, aesthetics as the cherry on top.

Leaving academia was a big decision for me. I've always seen myself as an educator at heart. But I left to build something I had dreamed of for years: an ideal learning environment. That's how Magne Education[8] was born here in Beverly Hills, with the partnership and vision of Sam Alawie (MDT, CEO, Beverly Hills Dental Lab). We offer a wide range of programs in English and Spanish– from online learning through our PRESSroom lecture series, to one-on-one distance mentoring through our Mentoring program, where clinicians bring their cases and we work through treatment planning together.

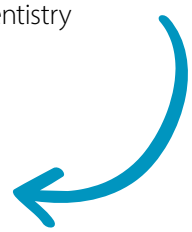
We also run an in-person mini-residency called the Continuum– five courses over 15 days– and a more intensive one-week Bootcamp for those who can't travel multiple times. It's a deep dive into morphology, aesthetics, direct composites, CAD/CAM and more. For me, this is a dream realized: creating a space where we teach dentistry the way it should be taught – starting with the tooth, not the restoration.

What advice would you give to young dentists who want to follow in your footsteps?

Dr. Magne: To young dentists, be mindful of misinformation, especially on social media. Many still misuse terms like "biomimetic" or confuse old and new concepts. Remember that a concept that teaches you to remove more tooth structure than a classic crown preparation cannot be called "biomimetic". Even research can be misleading—clinical data is valuable, but in vitro studies are underrated and often offer deeper insights. You need to get the full picture (always read the whole article, not just the abstract) and evaluate it with a critical mindset.
But most importantly, follow your passion. Find the area of dentistry that excites you and stay focused on it – distraction is the biggest challenge today. And don't do it alone: find a mentor. A good mentor will guide, protect, and inspire you. I've been blessed with several mentors, and I wouldn't be where I am without

them, Drs Urs Belser, Bill Douglas, Didier Dietschi and my brother. I want to finish with a more personal note and give all glory to my ultimate mentor who taught me humility, forgiveness, compassion, and faith, while always providing practical and spiritual instructions. He is "The Light of The World" (John 8:12).

Discover what Dr. Magne says on strong materials in dentistry



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