

# Minimally invasive dentistry

Do you want to separate yourself from other dental practices? David Silber clarifies what minimally invasive dentistry means to him and how its implementation can benefit you and your patients

When I graduated from dental school and got my licence, I was eager to go out into the world and display all the skills I had learned. Yet after more than a year of actually dealing with dental insurance and patients in my Puerto Rico private practice, I became a little discouraged. I repeatedly asked myself, how did the profession allow insurance to take over dentistry? I was frustrated with the 'drill, fill and bill' aspect of dentistry; I wanted to stick out like a sore thumb!

Later on that year, the American Academy of Cosmetic Dentistry held its annual meeting in Puerto Rico. A representative for an air abrasion company at that meeting contacted me with such a great offer that I could not refuse to try air abrasion in my practice. My first patient following my air abrasion training convinced me that this was my way out of standard dentistry.

You see, that first patient needed two defective, rather large, amalgam restorations removed. Never one to hesitate, I proceeded to offer this patient drill-free removal of her amalgams with air abrasion followed by tooth-coloured restoration replacements. Now bear in mind that patients in Puerto Rico usually complain of the \$5-25 deductible per amalgam restoration and she would need to pay an

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**Figure 1: Den-Mat's Dector, my preferred caries detect stain, is an easy-to-spot green and is pre-loaded into miniature-sized unit dose dispensing sponges**

approximate \$65 deductible for the tooth-coloured restorations. She not only accepted the treatment plan, but had no problem paying the higher fee! What a concept.

Needless to say, I have learned much about the procedure since that day. However, that first lesson remains true. Patients will pay the extra euro or drive the extra mile to receive the treatment that they want, performed in the manner that they prefer. To follow a similar path out of the 'drill, fill and bill' routine, you must decide which tools to employ in your practice. This is certainly no easy task since there are so many gadgets and gizmos available – each of which proclaim to be 'the best'.

## The way forward

What is minimally invasive dentistry? It is the dentistry that we can practise today. The materials we now have in dentistry work for us instead of us working for the materials.

Amalgam requires a minimum thickness for strength and undercuts for mechanical retention. This results in a large amount of preparation done at the expense of healthy enamel



**Figure 2: Although functional, the porcelain fused-to-metal (PFM) crown no longer matches the rest of the smile and displays metal at the gingival margin**



**Figure 3: Air abrasion is used to remove the glaze from the porcelain, thus creating a rough surface for bonding**



**Figure 4: LUMINEERS by Cerinate porcelain veneers are placed over the existing PFM crown and natural dentition without the need for any anaesthesia**

**CLINICAL**

and dentine. Understanding modern adhesive dentistry, we can now remove only that part of the tooth that is diseased and replace it with a tooth-coloured restoration that is aesthetically pleasing and conserves healthy tooth structure. Adhesive dentistry works for us, not against us.

There are a multitude of toys to help us in our diagnosis of intra-oral decay. I have incorporated two into my daily practice. The first one is KaVo's DIAGNOdent. This is not only an accurate laser caries detector, but when used in the right manner can also lead to a lot of conservative dentistry. It is a great tool to help the patient understand where diseased tissue is present. My hygienist uses it to compare diseased tooth structure with solid tooth structure. Then when I arrive in the room, the patient is eager for me to begin the restoration.

The second tool I use is caries detect stain. This intra-oral dye shows me exactly where the decay is present. It is a great visual for the patient and the dentist. Studies have demonstrated that detection of decay with the explorer alone shows only 24% of the decay that is present. Many restorations with beautiful margins eventually fail because of 'recurrent decay'. Recurrent decay, I would argue, is diseased tissue that was left behind at the preparation stage. We restore it, after visual and tactile examination. By using caries detect stain, you can be sure that the surface is disease-free and thus create a longer-lasting restoration.

These tools partner together in a useful way. With the use of the DIAGNOdent you can identify decay. With the use of caries detect stain you can confirm absence of disease.

**Air abrasion**

Once the patient accepts treatment, you must decide how to prepare the occlusal surface. You can numb the patient, grab your electric handpiece and bur, and proceed to finalise the cavity preparation.

I have been clinically convinced that tooth surfaces

can be successfully cleaned of decay without having to subject the patient to a needle or the intense sounds of the handpiece. How? The greatest concept of minimally invasive dentistry – air abrasion.

You may hesitate because air abrasion was not part of your dental school curriculum. Well, let me tell you how easy dentistry can be with the use of air abrasion. If an occlusal pit has decay, either visual or tactile, you were likely taught to use the following phrase: 'Let's observe that tooth'. May I ask, what exactly are we waiting for? For the decay to get deeper so that we feel comfortable in our decision to prepare that tooth with our handpiece and bur, so that the removal of the disease is deeper and more grandiose?

Let's consider the other option – air abrasion. Air abrasion has been around since the advent of the Borden air turbine in the early 1950s. The turbines were cheaper than all the equipment needed to make these air abrasion units, so you can understand why one was mass produced and the other went back to the drawing board. However, thanks to technological advancements, air abrasion came back with a solid bang in the late 1990s and is even better now.

What is air abrasion? As I tell the patients, it is like going to the beach. An instrument that combines air and sand is used to remove the decay from the tooth. Basically, it is an instrument to remove decay.

The biggest concern with decay is having a comfortable patient. With air abrasion you can optimise patient comfort by adjusting the air pressure at different stages of the procedure. For instance, as you approach the dento-enamel junction (DEJ), where the patient is more sensitive, you should lower the air pressure. Patients will not understand the steps you are taking, but they will certainly appreciate the fact that you care and do not cause them pain. What a practice builder! Imagine the effect of your patient telling friends and family, 'I just went to the dentist and he filled four teeth without

giving me an injection or using a drill!'

The air abrasion technique is not limited to use only on enamel. It can also effectively roughen the porcelain surface of existing crowns and bridges. Wondering why you might want to accomplish such a thing? Doing so allows you to bond thin porcelain veneers to the existing porcelain restorations and create a 'new' appearance without the need to remake the crown or bridge. The LUMINEERS BY CERINATE system, utilising Ultra-Bond resin bonding restorative, is the only porcelain veneer system that has clinically demonstrated this use. Patients get very excited about this much less

invasive method of improving the appearance of their old restorations. Tally up the number of crowns and bridges you see in your practice that are functional but perhaps reveal metal due to gingival recession or no longer match the shade of the smile – you will be amazed at the enormity of this opportunity to help your patients' smiles with LUMINEERS.

Air abrasion combines an aluminium oxide powder with air. The manufacture of the powder may vary slightly, however it is generally available in two sizes. The diameter of the aluminium oxide particles may be either 27 micron or 50 micron. The 50 micron particle



**Figure 5: The LUMINEERS BY CERINATE system, including Ultra-Bond Plus resin bonding restorative and Tenure bonding system**



**Figure 6: The Crystalmark air abrasion unit can use air or helium. The latter will prep twice as fast as air with no increase in patient sensitivity**

is for gross removal of decay and is much messier than the 27 micron particle. I prefer the 27 micron particle because it is cleaner and more conservative. An air cleaning unit can ensure that the excess powder is absorbed by the cleaning unit, minimising the mess associated with air abrasion.

You may choose a simple air abrasion unit like the one from KaVo that connects to your standard high-speed handpiece adaptor or a stand-alone unit. Some stand-alones include an independent air source, while others connect to the air source that is available in your dental unit.

The latest air abrasion unit employs a combination of air and helium for even lower pressure to remove disease. Personally, I prefer the helium/air combination unit from Crystalmark. It is a free-standing unit that is very easy to use and maintain. Some of these units can be very difficult to maintain, requiring (among

other things) that the pinch valves be replaced whenever you fill the chamber with powder.

### Restoration

You have already identified decay with the DIAGNOdent, confirmed disease with the visual aid of the caries detect stain, and removed the decay with air abrasion. The tooth is ready to be restored.

To begin the adhesion process, the tooth is etched and treated with a bonding agent. For the restorative, I prefer to use a flowable composite because it ensures that every irregularity from the preparation will be filled. As it flows, it restores. Some of these materials flow too much – moving all over the place before you can put your curing light to it. Based on my personal experience, I choose Den-Mat's Virtuoso Flowable. This material has enough flow to it while, at the same time, it stays in place without flowing



**Figure 7: Colour-coded for easy recognition, six different diameters, in both 45 and 90 degrees, are available for the air abrasion handpiece**

all over the adjacent teeth.

The selection of curing lights is quite vast: a standard light, an LED, a plasma arc. I personally believe in the need for speed. If you use an LED, it may take up to 20 seconds to cure; using a standard halogen it may take 10 seconds. I like Den-Mat's Sapphire Supreme plasma arc light because I can cure the composite down to 6.5mm in three seconds. When you consider a curing light, realise that the composite must absorb about 10 to 12 joules of energy to reach your restorative material's maximum hardness. If

### The multiple uses of air abrasion

Air abrasion can be used on many surfaces and in a multitude of ways to expand your treatment options:

- Enamel – conservatively remove decay
- Porcelain – roughen the porcelain surface of existing restorations to bond LUMINEERS porcelain veneers for pain-free cosmetic enhancement
- Metal – reduce and roughen the metal margin on porcelain fused-to-metal restorations to allow direct bonding of LUMINEERS and to mask the dark metal effectively. Using GoldLink and Infinity, crowns may also be placed
- Composite and acrylic – conservatively remove to update or roughen for direct bonding of LUMINEERS.



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the light you are using does not emit the amount of energy required, your composite will not absorb the energy and it will take longer to achieve maximum hardness of the composite.

I have made my life very simple when it comes to

polishing. I adjust the occlusion using carbide polishing burs. When the occlusion is functional, I use an amalgam polisher, brownies and greenies of the high-speed handpiece, with lots of water. This will give you the best possible polish of

your composite restoration.

In conclusion, air abrasion furthers your ability to practise minimally invasive dentistry – both general and cosmetic. Minimally invasive dentistry leads to referrals from your existing patients, who in turn

tell their friends what a fantastic, caring, non-painful dentist you are. Remember, word of mouth is what gets new patients through the door. The more referrals you get, the more chances you have to grow as a clinician. 



**Figure 8: Pre-operative appearance of occlusal decay**



**Figure 9: Air abrasion preparation removes only the decay**



**Figure 11: The Sapphire Supreme plasma arc light delivers the power to achieve maximum composite hardness in three seconds**



**Figure 10: Virtuoso Flowable easily flows into small areas and has excellent handling**



**Figure 12: After air abrasion preparation, the tooth is restored with Virtuoso Flowable and polished for a beautiful finish.**