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early bird

Early decay detection with the dental world's version of a canary in a mine

It used to be that miners took canaries into coal mines to test air purity. The reasoning was that these birds were sensitive to toxic gases. In the event such toxicity existed in the underground air, the birds would show signs of illness in time for the miners to save themselves. Early detection proved to be advantageous.

It's a similar theory with the Canary System by Quantum Dental Technologies. The non-invasive system acts as a sentinel against cavities, providing dentists and patients with the ability to detect the very

may be reversible," says Abrams. It used to be that dentists would watch and wait when they saw spots. "What are you watching? You're watching the cavity grow or shrink. The old tool—the visual exam—was not a great tool."

"The biting surface, unless you saw a shadow beneath the surface, an x-ray wouldn't allow imaging," he adds.

Abrams had asked himself if there was a better way of providing care and determined that the correct pulse of a laser beam might be the answer. Pulsing laser beams were

"If the laser is always on, you see a reflective glow. As soon as you pulse it, you see what happens when a packet of energy hits the tooth and after you allow the energy in. It comes back. A change of heat and luminescence will show an area of decay. With the Canary System, we simplified what took ten years to understand," says Abrams.

The interaction of the laser reflects both heat and light from the tooth surface. This translates into a Canary number which alerts the dental professional to how much attention each tooth requires. Better still, the patient can receive a printout, colour-coded, that helps them understand their own oral health.

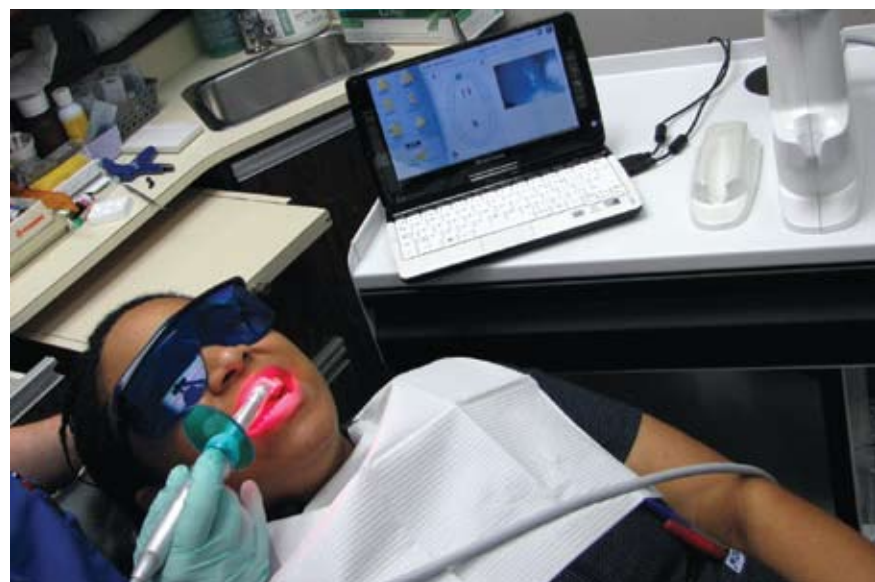
"It's a new way to engage patients in their oral health care," he says. The Canary System also allows patients to understand their baseline, and lets them know how their mouths are progressing during treatment. The system assigns a number and provides an easy reference to track changes. It also has a voice interface so patients can hear their numbers.

"The most common reason for missing work is treating tooth decay," says Abrams, so an accurate way of monitoring and detecting decay at the early stage can help patients to implement a home program to reverse the decay and avoid large cavities, and have a significant impact on their overall lifestyle.

"In the office, there's a variety of things the dentist can do: fluoride varnish, different anti-microbial mouth rinses, home-based therapies. Dentists can use the Canary System to detect tooth decay, set up and monitor a prevention-based program."

The return on investment is about eight months. Dentists use the system, which became available in Canada in April 2011, to do repeat scans to monitor progress of various preventive or re-mineralization therapies.

"Depending on the philosophy of the practice, the scan can be incorporated as part of the exam fee," says Abrams. "The Canary System allows you to move your practice into the 21st century by detecting tooth decay from the beginning to the end of its cycle, and monitor it on an ongoing basis." ●



early stage of cavity development when the likelihood of correction is still possible.

"The Canary System is a laser-based device for the detection and ongoing monitoring of tooth decay," says Dr. Stephen Abrams, president and founder of the Canary System. "It detects defects in the crystal structure of the tooth surface."

Because there's a period of time when breakdown of the tooth surface occurs, early detection means there's an opportunity to reverse the damage caused by the decay and re-crystallize or re-mineralize the enamel. It's a fundamental shift in how to detect and treat tooth decay.

"The status of research indicates decay

used to detect defects in steel and in silicon wafers. Abrams believed the same technology could be applied to tooth enamel. Research just needed to understand the correct wavelength to use, and then the company had to build a handheld device.

"We understood the phenomenon worked in other worlds. We had to bring it down to the dental office. If you heat the tooth's surface, it does matter," he says. The technology used by the Canary System is called PTR-LUM—photo-thermal radiometry and modulated luminescence. This technology was refined for use in dental applications by Quantum Dental co-founder and applied physicist Dr. Andreas Mandelis.

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