

### Quantum Dental | Toronto

## Quantum develops ground-breaking dental care device

### Early cavity detection system could dramatically reduce the need to drill and fill

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**Dr. Stephen Abrams**  
CEO  
Quantum Dental Technologies

With help from the Ontario Centres of Excellence (OCE), Toronto-based Quantum Dental Technologies has created a device that can shift dentistry from drilling and filling to early detection and prevention.

Created by University of Toronto Professor Andreas Mandelis, in collaboration with Dr. Stephen Abrams, the Canary Dental Caries Detection System uses a safe, low-power hand-held laser for detecting very small areas of tooth decay.

The laser is non-invasive and remarkably accurate – detecting tooth decay a fraction of a millimetre in depth and up to five millimetres below a tooth’s surface. It gives dentists the opportunity to halt or reverse the early stages of decay with re-mineralization techniques which are far less invasive, expensive and painful, compared to needles and fillings.

The partnership was formed painlessly when Dr. Mandelis found himself in Dr. Abrams’ dentist chair, discussing conventional dental methods. Dr. Abrams was frustrated with the reactive approach dentists took when dealing with cavities, especially with younger patients. Because tooth decay was hard to detect on the biting surfaces of back teeth, Dr. Abrams found himself treating patients, unsure what he would find.

“It was so annoying to treat cavities rather than prevent them,” says Dr. Abrams. “My thoughts evolved from ‘Why do I need to wait until it’s become a large filling that can be detected and

fixed,’ to ‘What if we found it early enough so that we can re-mineralize it?’”

Turns out Dr. Mandelis could help. He had already started work with OCE on a project that tested thermophotonics (usable power from heat) and he was certain the methodology could be applied to dentistry, especially testing of the integrity of teeth.

With Dr. Mandelis’ technology and Dr. Abrams’ expertise in detecting cavities (also known as caries), they began research on the Canary System. OCE and other partners provided financial support for research at the University of Toronto.

As the research progressed, Dr. Mandelis looked to OCE for guidance in developing a business model and commercialization plan. With an already solid relationship, Mandelis believed the not-for-profit organization was the perfect partner to help Quantum achieve marketability.

“OCE was the catalyst for seeing the potential of this idea,” says Dr. Abrams. “It’s more than just funding, it’s really support. We met every six months to give OCE updates and to get their thoughts on where this project was going. As it matured, OCE brought in other resources to help move us into the marketplace. Today, when I meet researchers worldwide, they are envious of our relationship with OCE.”

