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Research behind The Canary System

The Canary System is an evidence-based caries detection system built upon a solid foundation of peer-reviewed lab and clinical research. This includes:

- 2 Health Canada approved clinical trials that met FDA 21 CFR standards for clinical trials
- 60+ peer-reviewed primary journal publications
- 44 presentations at international conferences including the International Association for Dental Research
- 14 publications in the “popular dental press” such as Oral Health and Dental Tribune

The research has demonstrated that the energy conversion technology (PTR-LUM) used in The Canary System can be harnessed to help oral health professionals **detect and diagnose**:

- Lesions and defects up to 5 mm. below the enamel surface^{1, 2}
- Occlusal pit and fissure caries^{3, 4, 5}
- Smooth surface caries^{6, 7}
- Acid erosion lesions^{8, 9, 10}
- Root caries^{11, 12}
- Interproximal caries lesions^{13, 14, 15, 16}
- Beneath fissure sealants^{17, 18}
- Detection of caries around the margins of restorations^{19, 20, 21}
- Beneath the intact margins of composite resins²²
- Demineralization and remineralization of early caries lesions (as small as 50 microns)^{23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33}

Clinical Trials

The Canary System has been investigated in two Health Canada-approved clinical trials in 2009 and 2010. The first Investigational Study was completed in December 2009. The trial involved 50 patients using the first prototype in a number of clinical situations and found no safety issues^{34, 35}. The second clinical trial was a follow-on study designed primarily to help Quantum Dental Technologies define the Canary Scale and determine how to best integrate the system into a dental practice. The second study involved 98 patients among four trial sites with 38 patients involved in multiple visits for monitoring the effects of various remineralization therapies^{36, 37}.

Study Design Ensures Unbiased Results

Our research is divided into two parts: First, Canary Scans are performed in Toronto and then the tooth analyses are conducted at the University of Texas in San Antonio in the laboratory of Dr. Ben Amaechi. Dr. Amaechi sections the samples and measures the size or shape of the lesions. With this method, there is no bias in terms of what samples to include in the final analysis. Our samples are taken from a wide range of clinical situations. Our studies use the ICDAS visual ranking scale to help us select teeth with various lesions from white spots to large areas of tooth decay. We usually will take five samples from each of the ICDAS ranks so that we do not bias the data. We have two dentists independently and visually rank each lesion. The two dentists sit down, review their rankings and come to a consensus. All their rankings and the consensus are recorded and compared and correlated to the readings from the Canary System.

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