Using PTR-LUM ("The Canary System") for *in-vivo* Detection of Dental Caries: Clinical Trial Results

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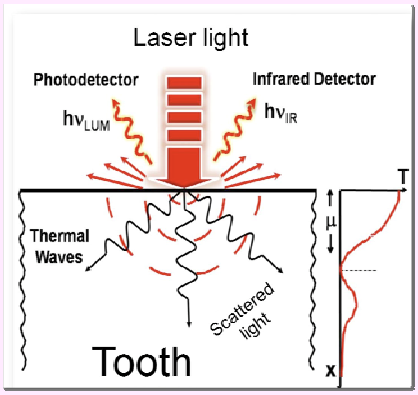
- The Canary System, based on PTR-LUM technology, obtained Health Canada approval (QDT-101) for testing the safety and effectiveness for clinical detection of carious lesions.
- Sound enamel surfaces (500+ measurement sites) of 50 subjects were used to construct a sound baseline calibration level.
- The Canary System proved to be an effective and safe caries detection device.

The Canary System Technology

- When a modulated light source (660-nm laser beam) strikes the tooth surface,
- the light is converted into:
  1. Heat (<1°C), which moves into the tooth as waves of thermal energy (PTR).
  2. Another form of fluorescent light called luminescence (LUM).
- Changes in the tooth microstructure, due to caries, causes corresponding changes in the optical and thermal properties of the tooth and the resultant PTR-LUM response.
- In this study, the Canary Number was measured from PTR-LUM amplitude (A) and phase (P) responses on sound and carious enamel surfaces (ICDAS 0-6).
- While PTR-A and PTR-P were used to detect near-surface and subsurface lesions, LUM-A and LUM-P were used to detect near-surface lesions.



First Clinical Trial Results

Image Number	1	2	3	4	5	6
ICDAS Reading	0	3	1	3	6	6
Canary Number	1	43	429	443	1600	1992
PTR Amplitude	44.45	79.99	156.26	79.99	233.26	130.42
PTR Phase	5.10	29.13	42.63	37.54	58.68	66.37
LUM Amplitude	83.02	21.19	43.50	13.53	44.67	33.55
LUM Phase	0.31	0.39	2.80	1.99	5.22	7.72

- The Canary System did not cause any adverse events or soft/hard tissue trauma.
- The Canary Number:
  - ✓ NO change in wet or dry isolated field.
  - ✓ NO change outside the sound enamel calibration level due to stains and plaque.
  - ✓ The same on anterior and posterior sound surfaces.
  - ✓Shifted significantly from the sound calibration level due to caries [↑PTR (thermal signal) and ↓LUM (fluorescence signal)].

Conclusion

The Canary System proved to be an effective and safe caries detection device

The Canary System www.thecanarysystem.com by Quantum Dental Technologies

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