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Presentation Type: Oral Session

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Objective: Using PTR-LUM energy conversion technology, The Canary Lab System is a bench-top instrument that permits the non-invasive and non-destructive longitudinal monitoring of carious lesions. The Canary Lab System is able to detect and monitor small areas of decay on smooth enamel or erosive lesions caused by exposure to acidic liquids. An *in vitro* study was conducted to evaluate the potential of The Canary Lab to detect and image dental erosion.

Method: Sound smooth surfaces from extracted human teeth were selected and polished flat to remove the outer enamel. Samples were mounted on a three-axis micrometer stage, and the surface of interest (6 x 6 mm) was scanned in 1mm steps with a pulsed 2 Hz laser and imaged using The Canary Lab. Subsequently, samples were treated with 37% phosphoric acid to etch a region of interest for 5, 10, 30 and 60 seconds. The same region-of-interest were then scanned again with Canary Lab after each individual etch. Erosion was confirmed with SEM.

Result: Microporosity was increased evidenced by both an increase in the Canary Number as well as a change in colour. Following the 30 second etch, the delimited etched circle was clearly visualized with the higher Canary Numbers. These trends are enhanced with the 60 second etch. This expected behaviour occurs as the microporosities of the etched surface confine the converted thermal energy to the defect region and as a result, emits a greater photothermal response. This occurs with a concomitant reduction in the luminescence response as the etched white surface is highly scattering of both the incident and converted light.

Conclusion: In this study, the ability of The Canary Lab System to detect, image and monitor the progression non-destructively of early erosion lesions on enamel has been demonstrated.

Keywords: Canary Lab, Caries, Digital image analysis and Erosion

Presenting author's disclosure statement: Employee of Quantum Dental Technologies.

See more of: [Caries Detection, Caries Quantification, and Risk Assessment](#)

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