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176008 Clinical Detection and Monitoring of Caries Using The Canary System

Friday, March 22, 2013: 2 p.m. - 3:15 p.m.

Location: Hall 4 (Washington State Convention Center)

Presentation Type: Poster Session

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Objective: The Canary System™ (CS) is a laser-based detection system for caries. Using the photothermal radiometry and luminescence (PTR-LUM) energy conversion technology, CS can detect and monitor changes in enamel crystal structure. Given that CS is used clinically by Canadian dentists, our aim was to further evaluate CS's performance in distinguishing healthy from carious enamel in patients.

Method: A multi-center study to evaluate the safety and effectiveness of CS was conducted in 98 volunteers from four clinics in Toronto, Canada. Prior to Canary scans, demographical and dental (risk, diet, hygiene) information were collected. Tooth surfaces and regions-of-interest (ROI) were selected and scored by an independent dentist using the ICDAS II criteria. Selected ROI were scanned and imaged using CS to output Canary Numbers (CN; relative measure of the status of the enamel) and photographs. CS's ability to distinguish healthy from carious surfaces was examined in four categories: 1) Healthy enamel and root surfaces; 2) Caries lesions of varying severities; 3) Monitoring remineralization of caries lesions; and 4) Detecting caries beneath and around restorations.

Result: The CNs for the status of the tooth surfaces correlated with ICDAS II scores. CN levels were compared using a random intercept mixed model. There was a significant difference ($P < 0.0001$) in CNs collected from surfaces ranked as sound (score 0) with ICDAS II compared to surfaces scored as varying lesion severities (scores 1 to 6). CNs collected from healthy surfaces were significantly lower ($P < 0.0001$) compared to surfaces with lesions, restorations, or brown/white spots. CS was able to differentiate between sound and demineralized enamel, detect incipient lesions, correlate CNs to ICDAS II rankings, detect lesions at the point of restoration, and detect and monitor lesions on various surfaces.

Conclusion: CS utilizes a non-invasive method to monitor carious lesions and effectiveness of a conservative remineralization treatment.

Keywords: Canary System, Cariology, Clinical trials, Diagnosis and Preventive dentistry

Presenting author's disclosure statement: President & CEO of Quantum Dental Technologies, manufacturer of The Canary System.

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