Use of the Reflectance Confocal Microscopy to Measure Epidermal Demarcation. IRENE PETROU*, CYNTHA M. MURPHY, and RICHARD J. SULLIVAN Cogitate-Palmpalm Company, Piscataway, NJ

A method was developed to quantify demarcation in denuded enamel using confocal reflectance microscopy (CLSM) in the reflection mode. A validation study was conducted to show that mineral loss in demarcated enamel increased as the reflectance confocal microscopy correlates with microradiographic measurements made by surface profilometry. Twelve bovine enamel blocks, approximately 5x5x1 mm, were polished until the front and back surfaces were parallel. The enamel surfaces were then covered halfway with an acid-resistant varnish to provide a sound and stable surface and were demarcated by immersion in 7.5% hydroxyapatite-saturated, acetic acid demineralization solution for 0.1, 0.35, or 1.6 hours. The varnish was removed after demarcation, and then reflectance and microradiographic measurements were made on both halves of each block, sound and demarcated. Enamel demarcation was expressed as means of the ratio of the 1.75 µm CLSM microradiograph to the CLSM microradiograph of the sound enamel. The results of the study showed that the loss of reflectance in after 1.3, 5.1, and 16 hours were 144.59 (a), 288.28 (b), 429.89 (b), and 496.93 (b), respectively. The corresponding losses in hardness (HV) were 30.9 (a), 29.6 (b), and 29.4 (b), respectively. The results indicate statistically different groups. A least squares analysis comparing demarcated measurement using reflectance confocal microscopy and surface microhardness was consistent with a linear fit (r^2 = 0.86). In conclusion, the results of this study show that CLSM in the reflection mode can be used to measure the demarcation of enamel. The results were therefore used to establish well an established surface microhardness methodology for measuring demarcated.

Use of a Force Transducer During Clinical Caries Detection. P. HARRIS*, C. STANFORD, J. WAGNER, G. THOMAS (University of Iowa, Iowa City, Iowa)

Previous studies of the forces used in caries detection have used data from "benchmark" studies. Purpose: The objective of this study was to use a force transducer to clinically measure the forces used during routine caries detection. Methods: The measurement system consisted of a force-detecting sleeve fitted over the handle of a #5 Shearup bur. The sleeve transmits four strain gauges (EA-06-2252-920) to detect forces in a vertical and lateral direction relative to the long axis of the explorer. Custom analog circuitry was designed to amplify and condition the output signal. Data recordings (500 Hz) for a force vs. time signal were displayed using a data acquisition (DTAS600, National Instruments). Treatment planned carious lesions were evaluated using the explorer and visual observation. Two recording sessions were made for each subject, one by each researcher. Data from each of the 50 subjects were analyzed for all subjects. Results: One-way ANOVA analysis was performed with Tukey's post-hoc test (x = 0.05). Vertical average force used in caries detection on teeth (1252) was explored on carious lesions (31.25 ± 32.5 N) vs. sound tooth structures (0.93 ± 0.30 mg). Adhesive drill were then measured for 2013 ± 31.60gmg with an average of 218.80 ± 32.70 mm for teeth (p<0.05). Left-handed clinicians averaged 289.67± 35.72mm while right-handed clinicians averaged 311.53± 37.41mm in right-handed professionals. The null hypothesis is rejected at 0.05 level. Leiberei and others (1272) have consistently highest vertical forces (p<0.001) than right-handed operators on the left quadrant. Conclusions: There is evidence in the literature for caries detection in the anterior vs. posterior quadrants. There was an effect of the hand dominated handiness. Measured vertical forces were consistent between 2 operators suggesting that a consistent buccal ormand range of force values are needed for.

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Clinical examination of carious lesions have been conducted to assess the feasibility of using a force transducer to quantify the force used by operators in caries detection. The aim of this study was to evaluate the validity of the technique using the same operator. The null hypothesis is rejected at 0.05 level. Leiberei and others (1272) have consistently highest vertical forces (p<0.001) than right-handed operators on the left quadrant.