

ABSTRACT: **0526**

LED BASED OCCLUSAL AND APPROXIMAL CARIES DETECTION IN VITRO

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Objectives: The aim of the study was to evaluate a novel LED based device for the detection of occlusal and approximal caries.

Methods: A total of eighty freshly extracted permanent premolars and molars were cleaned and stored in physiological saline solution. Specimens were divided into two groups of forty teeth each either for occlusal or approximal measurements. Teeth were set in blocks simulating the contact area. Caries diagnosis was performed using an LED device (D-Carie, Dentsply). LED light was transported to the occlusal or approximal area using the tip of the probe in contact with the occlusal surfaces. An audible signal differentiating three frequencies (low, moderate, fast) and the transition of the visual signal from green to red should identify the presence of caries. Bitewing radiographs were obtained using digital x-rays. Thereafter, teeth were prepared for histological examination. For statistical analysis, results of LED diagnosis and radiographic examination were compared to the histological caries extension.

Results: Signal frequency of the LED device and caries extension on bitewing radiographs were dependent on the histologically assessed caries decay ($p < 0.05$, chi-square) for both occlusal and approximal caries. A higher measure of association could be found between clinical carious extent and LED diagnosis in occlusal lesions ($\lambda = 0.704$) than for approximal lesions ($\lambda = 0.565$). Sensitivity of radiographic assessment in occlusal lesions (75.9%) was lower than the value for LED evaluation (100%) with comparable values for specificity.

Conclusion: Occlusal caries diagnosis can be improved by LED diagnosis compared to radiographic assessment. With respect to approximal lesions, carious decay is detectable with the probe positioned on the occlusal surface. However, further in vitro and in vivo studies have to evaluate the possibility of reducing or even replacing radiographic examinations.

[Seq #80 - Caries Diagnosis, Tooth Bleaching](#)

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