diagnostic tool during the treatment especially of deep cavities and might help to among others avoid an iatrogenic opening of the pulp chamber by estimating the residual dentine thickness.

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Detection of Caries around Ceramic Crown Restorations with the Canary System and DIAGNOdent

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The aim of this study was to evaluate the ability of The Canary System (CS) and DIAGNOdent (DD) to detect secondary caries around margins of crown restorations. Carious and sound teeth were prepared for a 3/4 ceramic crown, ensuring that margins remained on enamel. For the carious teeth, a dentist removed visible caries from the walls of the cavity ('sound walls' of carious teeth) while leaving some caries on the wall of one section of the cavity preparation ('carious walls' of carious teeth). Three groups of margins were examined: 'carious walls' in carious teeth; 'sound walls' in carious teeth; and sound walls in sound teeth. A blinded operator scanned 48 examination sites with CS and DD at the margins around crown, 0.5 and 1 mm away from the margins into tooth tissue. Canary Numbers (CN) and DIAGNOdent readings (DDR) were recorded. Previous studies established CN ranges of 0–20 and 21–100, and DDR of 0–13 and 14–99 to correspond to sound and carious tissue, respectively. For 'carious walls' of carious teeth, the mean ± SD CN/DDR at the margins, 0.5, 1 mm away from margin into tooth were: 31 ± 15 / 9 ± 7; 33 ± 19 / 8 ± 7; 23 ± 12 / 7 ± 5. For 'sound walls' of carious teeth, the corresponding data were: 26 ± 10 / 10 ± 3; 24 ± 9 / 12 ± 4; 19 ± 10 / 10 ± 4. DDR were at healthy tissue range for all examination sites. CN were within carious tissue range from the margins to 1 mm into tooth in all 'carious walls' and from the margins to 0.5 mm into tooth in all 'sound walls' of carious teeth, indicating presence of caries, but at healthy tissue range in all walls in sound teeth. This study demonstrated that, unlike DD, CS has the potential to detect secondary caries around crown margins.

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Influence of Different Magnification Devices on Visual Caries Detection with ICDAS

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In visual caries diagnostics 'optimum' vision is often recommended. Several devices are available to enlarge the vision: Galilean loupes, Keplerian loupes and surgical microscopes. We therefore wanted to test the influence of these magnification devices on validity and reliability of the ICDAS system. The influence of the clinical experience of the examiners was also assessed. There were three groups of examiners: (A) 5 3rd-year students without clinical experience; (B) 5 5th-year students with little clinical experience; (C) 4 dentists (2–16 years after graduation). Each of them examined 100 extracted molars with no obvious cavitations two times by naked eye, or by using a Galilean loupe (2.5×), a Keplerian loupe (4.5×), or a surgical microscope (10×) with at least one day between each examination. Histology served as gold standard. Bayesian analysis, kappa statistics and a chi-square test were applied. As a principal finding, the number of score '0' (healthy) decreased with magnification, while the number of score '3' (enamel breakdown, small cavity) significantly increased, especially with the surgical microscope. Sensitivity generally increased with magnification, while specificity decreased. For instance, in dentists, for D3 lesions the sensitivity (range) was 0.47 (0.17–0.79) by naked eye and 0.91 (0.83–1) using a surgical microscope, but the specificity (range) dropped from 0.78 (0.58–0.95) to 0.3 (0.07–0.55), respectively. The use of the surgical microscope had a negative effect on inter-examiner reliability in groups B and C (Fleiss' generalized kappa; $p < 0.05$). Intra-examiner reliability was not influenced by different magnifications. Experienced dentists showed the highest levels of specificities on all caries levels with all magnification devices. ICDAS is better used without the additional use of magnification devices, because their use might result in more and unnecessarily invasive treatment decisions.

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Caries Assessment of Occlusal Surfaces on QLF and White Light Photographs

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The aim of this in vitro study was to compare different assessment methods of occlusal surfaces: ICDAS – score on photographs, modified ICDAS and fluorescence loss assessed on QLF photographs and lesion depth assessed on photographs of hemisected teeth. Forty-six permanent molars (freshly extracted, without restorations, stored in tap water) were autoclaved and then the occlusal sides of the crowns were photographed with a QLF-D