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Detection of Early Occlusal Caries Using Different Techniques

(*Comparative in Vivo Study)*

A Thesis

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Abstract

Background: Dental caries is the most prevalent chronic disease in the world. When the initial carious lesions are taken into account, merely few persons are really unaffected. In most industrialized countries, 60-90% of school-aged children are affected and nearly 100% of the grown-up population are affected. The accurate early detection of dental caries on the occlusal surface of the teeth neither easy nor sensitive by using the traditional methods. Therefore, traditional methods should be a combined with more sensitive methods to improve the sensitivity and also help the clinician in monitoring non-operative treatments.

Aim of the study: The aim of this in-vivo study was to assess the clinical sensitivity, specificity and reproducibility of different methods (visual inspection, ICDASII, DIAGNOdent, CarieScan pro) used for early occlusal caries detection of the first permanent molar.

Materials and methods: This study examined 139 occlusal surfaces of the first permanent molar pooled from 50 children aged between 8-9 years. The selection criteria were first permanent molar with carious lesion range from 0 to 3 in the ICDAS II visual assessment system. All occlusal surfaces were cleaned with pumice slurry and extensively washed with water for 10 seconds, then ICDAS II criteria was recorded first followed by visual examination ,DIAGNOdent and CarieScan pro. The teeth were divided to groups according to the ICDAS II criteria which were used as gold standard in this study. The result of each examination method were validated according to the ICDAS II and the clinical sensitivity / specificity of each method for the D_1 (enamel threshold) and D_3 (dentinal threshold) were calculated. The reproducibility of each method was also obtained.

Results: The results of the receiver operator characteristic curve analysis for each method at D_1, D_3 threshold were obtained. Then, the reproducibility was

assessed. The visual inspection was the least favorable method for caries detection at both levels of diagnosis. The DIAGNOdent was the best method for dentinal caries detection with excellent results. The CarieScan pro was the most sensitive method to detect the enamel changes with good specificity for dentinal caries. The reproducibility of the DIAGNOdent was superior followed by the ICDAS II.

Conclusions: The CarieScan pro offered the best sensitivity at the D_1 threshold and good specificity for dentinal caries detection. The DIAGNOdent was the best in terms of sensitivity and specificity for dentinal caries detection, with better results than the enamel caries. The visual inspection was the least sensitive method but with good specificity.