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Title: Effect of image enhancement on detection potency of non-cavitated proximal caries in digital radiographic images

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Abstract: Objectives: The aim of this study was evaluation of image enhancement effect on non cavitated proximal caries detection in Kodak RVG 5100 and Digora (Soredex) digital receptors images enhanced with contrast and Highlights/Shadows filter.
Methods: One hundred thirty proximal non-cavitated posterior teeth surfaces were radiographed using two RVG and Digora digital receptors. Then images were enhanced with increased contrast and Highlights/Shadows filter separately and examined by three observers for presence or absence of carious lesions using a 5-point confidence scale. Definitive caries diagnosis was based on a histological assessment using a stereomicroscope after sectioning the teeth. Diagnostic results of images with or without image enhancement were compared to histological assessment results as a gold standard and ROC (Receiver Operating Characteristic) curve analysis and calculation of sensitivity, specificity, positive and negative predictive value and overall accuracy were done.
Results: Areas under ROC curve in RVG receptor images after enhancement with both methods were higher than images without enhancement but this differences were not statistically significant (P> 0.05). Area under ROC curve in Digora receptor in high contrast image is significantly higher than images without enhancement (P=0.014). Area under ROC curve in Highlights/Shadows filtered images in Digora receptor did not have any significant different with pre-enhanced images (P=0.181).
Conclusion: In this study image enhancement through increased contrast only in Digora receptor images improved accuracy of proximal caries detection. Image enhancement using Highlights/Shadows filter in any of receptors did not improve the detection of proximal carious lesions.

Radiographic image enhancement, dental caries, digital radiography

Presentation: Poster