

Proximal dental enamel caries diagnosis in digital radiography with and without sharpening enhancement filter (In vitro)

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Abstract

Background and Aim: The purpose of this study is to evaluate the diagnostic accuracy of direct digital radiography with and without using sharpening tool of digital radiography software in detection of inter-proximal enamel caries in premolar teeth.

Materials and Methods: In this in-vitro study, 80 sound premolars extracted due to orthodontic treatments were fixed in two blocks with putty impression material in XCP film holder in a way that 2 teeth were in upper jaw and two in lower jaw. Bitewing digital radiographs were taken and sharpening tool of digital software was applied on them. Then, a cavity was shaped on proximal surface of one randomly selected tooth from each block. At this stage, digital radiographs were again taken from blocks as mentioned above. 80 obtained images were printed 1:1 on film and were evaluated by an oral and maxillofacial radiologist. Data were analyzed by proportion test and kappa weighted test.

Result: Positive predictive value and negative predictive value for direct digital radiography was 97% and 84.8% and after applying sharpening tool was 91.2% and 80.4%. Kappa weighted rate for reader was 0.85. Proportion test showed that this difference is not statistically significant. ($p < 0.4$)

Conclusion: Application of sharpening tool of digital radiography software does not improve the detection of inter-proximal enamel caries.

Keywords: Dental digital radiography, Caries, Dental Enamel, Enhancements, Image, Software Tool