

Khan EA, Tyndall DA, Caplan D. Extra-Oral Imaging for Proximal Caries Detection: Bitewings versus Scanograms. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2003 Feb;95(2):242-2 (Abstract).

Abstract

Background: Extra-oral radiographic techniques for proximal caries detection have been studied and proven to be inferior to intra-oral techniques. However, the main focus was on panoramic radiography. Very few studies focused on other modalities such as tomography.

The Scanora® (Soredex Orion Corporation, Helsinki, Finland) multi-modal imaging system was introduced in 1991. It introduced the regional narrow-beam rotational scan (SCANOGRAM). Soredex Inc. stated on its Internet website that: "Scanograms can replace ordinary intraoral dental films" and "The mesially angulated scanograms are recommended for crown caries diagnosis". To our knowledge, there has been no study in the English literature to prove or disprove the claim of the manufacturer.

Objectives: To compare the diagnostic efficacy of three extra-oral imaging modalities with an intra-oral bitewing film for proximal caries detection.

Methods and Materials: Three modalities of Cranex TOME scanograms; x-ray film and DenOptix® photostimulable phosphor plates with and without digital enhancement were compared with Insight intra-oral radiographs for proximal caries detection. Nine observers evaluated images of the proximal surfaces of 45 extracted posterior teeth. The presence or absence of caries was scored using a 5-point confidence scale. The actual status of each surface was determined from ground section histology. Responses were evaluated by means of receiver operating characteristic (ROC) analysis. Areas under ROC curves (Az) were assessed through analysis of variance (ANOVA).

Results: Analysis of variance demonstrated significant differences among modalities but marginal differences among observers ($P = 0.0168$ and 0.0498 respectively). Post-hoc paired comparisons using Tukey's statistic demonstrated that only Insight was superior to unenhanced digital scanograms ($P = 0.016$). Mean Az scores were $0.7259 (\pm 0.08)$ for Insight, $0.6528 (\pm 0.06)$ for film scanogram, $0.6382 (\pm 0.04)$ for unenhanced digital scanogram, and $0.6641 (\pm 0.07)$ for enhanced digital scanogram.

Conclusions: The performances of film-based and enhanced digital scanograms were not statistically different from Insight film for proximal caries detection. Unenhanced digital scanograms exhibited a statistically significant lower diagnostic accuracy than Insight film. Scanograms need further evaluation before they can be recommended as a substitute for posterior bitewing films for caries diagnosis.