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Current and future trends in dental radiography

Film-based and digital intraoral imaging is one of the most popular diagnostic imaging systems in dentistry. However, this modality has many diagnostic limitations, is not effective enough to differentiate early caries in most cases and does not image soft tissue pathology. Recent studies have found no additional benefit in a radiographic exam when compared to clinical for detecting approximal caries lesions. Bitewing images are associated with low sensitivity for both proximal and occlusal surfaces. Radiographs have a poor performance for detecting non cavitated lesions

Near infrared laser wavelength (1300nm) applied in two modalities will enable dental practitioners to significantly enhance their diagnostic capabilities in detecting, characterizing and quantifying early, hidden and later stage oral diseases. As these imaging modalities are light-based, no ionizing radiation is generated. It is analogous to ultrasound, utilizing light instead of sound. The optical principles of interferometry, backscattering and transillumination of light through tissue capture real time macro imaging of NIR-TI and micro imaging of OCT.

Near Infrared Transillumination (NIR-TI) is a “macro” imaging modality that captures a composite image through tissue. This imaging is in real time, with better contrast and resolution than x-rays and includes the occlusal surface where 80% of carious lesions occur. Enamel is completely transparent with this wavelength.

Optical Coherence Tomography (OCT) is the fastest growing light based imaging technology for biomedical application. In dentistry it enables “micro” diagnostic imaging that captures real time 2D and 3D cross sectional slices of hard and soft tissue at a resolution of up to 10X x-ray. OCT enables the early detection and treatment of oral diseases, including early demineralization and remineralization, periodontal disease, oral mucosal pathology and micr-structural defects.

There is a need for better diagnostic tools that are more specific, with high sensitivity and specificity.

Biography

Arthur Goren is Clinical Professor, Department of Cariology and Comprehensive Care, NYU College of Dentistry; Clinical Associate Professor, Department of Prosthodontics and Digital Technology, Clinical Associate Professor, Department of Oral Biology and Pathology, School of Dental Medicine SUNY Stony Brook. He is also a Fellow of the American Academy of Oral And Maxillofacial Radiology. Dr. Goren is a past director of the Division of Radiology, School of Dental Medicine SUNY Stony Brook. He also has over 60 articles published in peer reviewed journals and over 75 published abstracts. He has lectured nationally and internationally on Radiology, plus being a reviewer in Radiology for many dental journals. Dr. Goren also has chaired several committees in the American Academy of Oral and Maxillofacial Radiology. He also has had several research grants.

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