



ORAL PRESENTATION

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Wide-field and high-resolution optical imaging for early detection of oral neoplasia

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Current procedures for oral cancer screening typically involve visual inspection of the entire tissue surface at risk under white light illumination. However, pre-cancerous lesions can be difficult to distinguish from many benign conditions when viewed under these conditions. We incorporated cross-polarization, narrowband reflectance, and fluorescence imaging modes in a portable, robust, wide-field imaging device to reduce specular glare, enhance vascular contrast, and detect disease-related alterations in tissue autofluorescence.

We have also developed a portable system to enable high-resolution evaluation of cellular features within the oral mucosa in situ. This system is essentially a wide-field epi-fluorescence microscope coupled to a 1mm diameter, flexible fiber-optic imaging bundle, capable of imaging nuclear size and nuclear-to-cytoplasmic ratio following topical application of a fluorescent labeling solution. Proflavine solution was used to specifically label cell nuclei, enabling the characteristic differences in N/C ratio and nuclear distribution between normal (b) and cancerous (d) oral mucosa to be quantified. This presentation will discuss the technical design and performance characteristics of these complementary imaging systems. We will also present data from ongoing clinical studies aimed at evaluating diagnostic performance of these systems for detection of oral neoplasia in high- and low-prevalence populations.

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