Commentary:

Oral cancer is one of the most dreadful diseases affecting humankind. Oral Squamous Cell Carcinoma (OSCC) is one of the most common malignant disorders and major causes of mortality worldwide. The oral cancer commonly arises from premalignant lesions, and the detection of cancer in this early stage can decrease the morbidity and mortality rate. Overall, 30-35% of global head and neck cancer occur in India (by Mohammad et al). Despite the ease of oral examination of malignant lesions, only 40% cases are diagnosed in early stages and survival rate has not been improved. Unfortunately, the OSCC does not have a better prognosis till date and the survival rate of patients with OSCC has not improved in the past 50 years. As 50% of OSCCs arise from potentially malignant disorders, thus early identification of cancer can improve the survival rate. If the disease is diagnosed in the early stage, the rate of better prognosis would increase significantly. The standard method for diagnosing potentially malignant and malignant lesions is by oral examination and confirming suspected lesion by biopsy. However, survival rate increases up to 83% in early detection. In cancer diagnostic field, numerous screening and adjunctive diagnostic adjuncts have been introduced till date. Some of these techniques are cytological methods, vital tissue staining, histological, molecular, and optical techniques. Among these Optical techniques are in recent forefront. They are mainly depending on light tissue interactions.

In latest era, optical techniques have been illuminated in cancer diagnostics which uses light for diagnosis. Optical coherence tomography, Chemiluminescence and fluorescence spectroscopy are newly developed adjuncts. These optical techniques provide noninvasive, real-time images and produce images of backscattered reflections to produce images.

Fluorescence spectroscopy modality is based on optical spectroscopy characteristic features of tissue and uses Native Cellular Fluorescence (NCF) to distinguish normal tissue from neoplastic tissue. Some cellular and molecular changes are observed in neoplastic tissues, such as the collagen degradation and loss of elastin cross-linkages, large increase in number of inflammatory cells in the tissues, an increased nucleus-cytoplasmic ratio, hyperplasia of the epithelium, and increased concentrations of oxy- and deoxyhemoglobin, can lead to the loss of fluorescence (LOF), hence these areas appear dark under velscope light. Lesions showing LOF or that were seen as red/orange areas under light of specific wavelength were considered to be suspicious sites (positive VEL).

Optical Coherence Tomography (OCT) is a optical imaging modality and works on the principle of white light Michelson interferometry, similar to Ultrasoundography. Hence comparable to Sonography. Different versions of OCT are, Original version Time Domain OCT (TD-OCT), TD-OCT further modified as Spectral Domain (SD-OCT) and Swept Source (SS-OCT). OCT has Sensitivity 83% and specificity 98% according to Fomina et al.

Luminescence means emission of light. When a molecule in excited state relaxes to ground state and the energy is provided by chemical reaction a phenomenon called as Chemiluminescence. Commercially available Chemiluminescence diagnostic kit are Microlux DL, Vizilite. Vizilite kit contains 1% acetic acid, capsule aspirin and inner glass vial which breaks easily on activation of capsule with Hydrogen peroxide (H2O2). Manipulation of capsule leads to emission of light. Blue white light emitted is absorbed by normal mucosa and reflected by neoplastic cells, hence the term “acetowhite” lesions.

This poster will highlight these newer optical techniques can be used for screening of potentially malignant and malignant lesions of oral cavity.
References


Keywords: Chemiluminescence; Fluorescence Spectroscopy; Optical Coherence Tomography; Optical Diagnostic Aid.

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Corresponding Author:
Anagha P. Bhelonde,
Department of Oral Medicine & Radiology,
MGV’s KBH Dental College & Hospital,
Nashik, Maharashtra, India.
Email id: abcuteanu569@gmail.com