

Poster journal

Cage the crab with light- A Review

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Commentary:

In developing countries with high consumption of tobacco-related products, the incidence of oral potentially malignant disorders (OPMD) and oral cancer is high. In such cases, the gold standard diagnostic aid remains to be a histopathological examination based on tissue biopsy. Early diagnosis and treatment aids in either preventing the malignant transformation of an OPMD or in halting the progression of oral cancer. Also, an early diagnosis would aid in improving the overall quality of life of the patient, while significantly reducing any financial burden related to treatments of cancer¹. Since not all cases can be subjected to a biopsy due to a wide range of contradicting factors including systemic conditions (bleeding disorders), a clinical examination is still a vital tool for the initial assessment of a suspected case. Given the limitation of a simple visual examination², several light-based oral screening techniques have been introduced which increases the capability to distinguish benign lesions and malignant lesions, dysplastic and non dysplastic changes².

Toluidine blue is a vital dye used to stain nucleic acids². It has been used to recognize dysplastic changes and abnormality in the oral mucosa. Toluidine blue has shown to have high specificity in detecting carcinoma but its sensitivity is low in detecting dysplasias. Furthermore, a toluidine blue has higher false-positive rates than other innovative oral cancer screening modalities. Thus, toluidine blue use is highly limited for primary screening of oral cancer. Another light-based technology includes the Vizilite system which involves the use of chemiluminescent light along with acetic acid. The patient is asked to rinse the mouth with 1% of the acetic acid solution for approximately 1 minute, followed by an examination of the oral mucosa under diffuse blue or white chemiluminescent light with the wavelength of 490 to 510nm. The reason for preconditioning using acetic acid is that it removes the glycoprotein barrier and slightly desiccates the oral mucosa. The abnormal cell of mucosa absorbs and reflects the blue or white chemiluminescent light in different ways compared to normal cells^{2,3}.

Tissue autofluorescence is also used in the screening and analysis of premalignant and malignant lesions of the oral cavity. The mechanism of tissue autofluorescence is that the abnormal mucosal changes in the structure and metabolism of the epithelium as well as changes of sub-epithelial stroma alter their interaction with light. Specifically, these epithelial and stromal changes can alter the distribution of tissue fluorophores and as a result, affect the way they emit fluorescence after stimulation with intense blue light. It improves the contrast of the lesions and thus increases the ability to differentiate healthy mucosa and mucosal lesion. Similarly, the VELscope, another light-based oral cancer screening technique has given very promising results as it is effective in identifying lesions and its margins which cannot be seen by visual examination under white light^{4,5,6}. Using histopathological examination as the gold standard, VELscope system demonstrated high sensitivity and high specificity as compared to tissue autofluorescence which has high sensitivity but low specificity in analyzing the lesion margins and the regions of dysplasia and areas of cancer cannot be evident in tissue autofluorescence that can be visualized by VELscope^{2,3}. The most important clinical application of Velscope includes the assessment of specifically lesion margins in patients with premalignant and malignant lesions and thus supports in treatment⁷.

In recent times, the vizilite system was upgraded which includes the new chemiluminescent device and also the use of toluidine blue called Microlux light. Using dental magnification and microlux indirect illuminations, healthy and diseased tissue, dental defects, deposits, can be visualized². The present poster reviews the oral cancer screening techniques which have proved to be beneficial in early detection of OPMD and oral cancer, and also to distinguish between dysplastic and normal mucosa.

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