

REVIEW ARTICLE

EARLY DETECTION OF ORAL CANCER: EXIGENCIES OF AWARENESS AMONG DENTAL PRACTITIONERS

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ABSTRACT:

It is not uncommon for general dental practitioners to come across oral lesions in their day to day practice. Screening for and referring lesions of concern are an important part of a dental practice. Adjunctive visual tools can enhance contrast between the clinical lesion and the adjacent normal oral tissue. This review article emphasizes the demand for extensive surveys to be conducted in different regions of the countries where oral pharyngeal cancer is highly prevalent and discusses various screening methods for early detection of oral cancer.

Keywords: Toluidine blue; Fluorescence Visualization; Oral Screening; Oral cancer

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This article may be cited as: Singh HP. Early Detection Of Oral Cancer: Exigencies Of Awareness Among Dental Practitioners. *Int J Res Health Allied Sci* 2015;1(1):2-5.

I**NTRODUCTION**
Oral and pharyngeal cancer, grouped together, is the sixth most common cancer in the world with the annual estimated incidence is around 275,000 for oral. In high-risk countries such as Sri Lanka, India, Pakistan and Bangladesh, oral cancer is the most common cancer in men, and may contribute up to 25% of all new cases of cancer.¹
It is not uncommon for general dental practitioners to come across oral lesions in their day to day practice. Screening for and referring lesions of concern are an important part of a dental practice. Screening is defined as the application of a test or tests (including a clinical examination) to identify individuals who probably have a disease, in order to separate them from those who probably do not. A screening examination is not a diagnostic examination, but aims to identify abnormalities that should be referred for further investigation, diagnosis and management. Some people who screen positive might, on further investigation, be found not to have the disease (false positives) while others might have a negative screen, but go on to develop the disease (false negatives).²
Oral cancer is frequently preceded by an identifiable pre-malignant lesion and the progression from dysplasia. It has four cardinal signs which necessitate further investigation. These are erythroplakia, leukoplakia, mixed

(erythroleukoplakia), and ulceration. Of these the commonest presenting sign is ulceration. The preponderance of this disease can be identified through general medical and dental care.³

Early detection of oral cancer needs more than just understanding of the signs and symptoms of disease. The process need to be managed effectively and perceptively. Regular examination of the oral cavity of patients attending the dental clinic should be carried out and management of detected mucosal lesions with appropriate referral along with management of patients with lifestyles that contribute to an increased risk of oral cancer should be considered.²

Health care providers agree that early detection improves 5 year survival rates of oral pharyngeal carcinoma. Awareness of etiology and clinical presentation of oral cancer, early detection and knowledge about novel trends among dentists is one of the best ways to manage and prevent oral cancer.⁴ As oral and pharyngeal cancers can be recognized at an earliest stage by visual and tactile examination, dentists are one of the most likely groups of health care practitioners who have a key role in counseling patients regarding early detection of oral cancer.⁵

CLINICAL EXAMINATION

The head and neck examination is often overlooked by busy clinicians but it is a crucial

element of the cancer screening examination. A thorough head and neck examination is necessary for detecting early cancers and enlarged lymph nodes that may indicate cancer metastasis. In addition to oral cancer, many chronic diseases can be exposed in the dental office since oral manifestations of systemic disease may be observed during a routine dental exam and oral cancer screening. Findings which should be noted include enlarged palpable nodes, fixed nodes, tender nodes and whether the palpable nodes are single or present in groups. Findings which include single or multiple, non-tender, and fixed nodes are very suspicious for malignancy.⁶

Lesions should be evaluated for specific characteristics with particular attention to size, colour, texture and outline. Particular attention to predominantly white, red and white, ulcerated and/or indurated lesions is indicated. Adjunctive visual tools can enhance contrast between the clinical lesion and the adjacent normal oral tissue.⁷

TOLUIDINE BLUE

Toluidine blue (TB) has been extensively used as a vital stain for mucosal lesions and also has found applications in tissue sections to specifically stain certain components owing to its metachromatic property. TB is generally prepared in 1% concentration for oral application. A 100 mL of 1% TB consists of 1 gm TB powder, 10 mL of 1% acetic acid, 4.19 mL absolute alcohol, and 86 mL distilled water to make up 100 mL. The pH is usually regulated to 4.5.⁸ The technique of application usually involves rinsing of the mouth twice with water for 20 s to remove debris. And 1% acetic acid is then applied for 20 s to remove ropery saliva. This is followed by 1% TB application for 20 s either with cotton swab when a mucosal lesion was seen or given as rinse when no obvious lesion was detected. Again, 2 rinses with 1% acetic acid were performed to reduce the extent of mechanically retained stain. Finally the mouth is rinsed with water.⁹ The interpretation is based on the color; a dark blue (royal or navy) stain is considered positive, light blue staining is doubtful and when no color is observed, it is interpreted as negative stain. Under normal conditions, nucleated scales covering the papillae on the dorsum of the tongue as well as the pores of seromucinous glands in hard palate are frequently stained with TB.¹⁰

Onofre MA et al¹¹ evaluated the reliability of in vivo staining with toluidine blue in the detection of oral epithelial dysplasia, in situ carcinoma, and invasive squamous cell carcinomas in potentially malignant epithelial lesions and superficial oral ulcerations suggesting malignancy and reported

100% sensitivity in the detection of in situ and invasive carcinoma. Toluidine blue staining is an adjunct to clinical judgment. Similarly Hegde et al¹⁰ also evaluated utility of toluidine blue in precancerous and cancerous oral lesions and found a sensitivity of 97.29% and specificity of 62.5%.

Gupta A et al¹² evaluated the usefulness of toluidine blue and brush biopsy in precancerous oral lesions and squamous cell carcinoma and concluded that early detection of oral carcinoma is possible even at the precancerous stages by using noninvasive, painless and outpatient procedures, such as in vivo toluidine blue staining and brush biopsy.

FLUORESCENCE VISUALIZATION

The VELscope is a form of direct tissue fluorescence visualization that utilizes the loss of natural fluorescent characteristics of metabolic intermediaries to identify dysplastic and hypermetabolic activity.¹³ The biology underlying tissue fluorescence visualization (FV) is based on the combination of tissue morphology and native fluorescence. The intrinsic fluorescence is produced by naturally occurring fluorophores in the epithelium and stroma that become excited when specific wavelengths of light are absorbed, re-emitting light of a different wavelength. This fluorescence is modified during carcinogenesis through direct alterations to the fluorophores themselves or indirectly by changes in tissue morphology that affect light absorption and scattering.¹⁴

Screening for disease entails testing people who apparently are symptom-free from the disease in question, to differentiate between those who probably have the disease and those who probably do not. Usually, screening tools are highly sensitive but are not specific; in addition, they may have high rates of false positive results. A false positive result occurs when the clinical diagnosis of an abnormality is investigated by surgical biopsy but the tissue is histopathologically normal. A screening technique does not provide a diagnosis.¹⁵

BIOPSIES

A surgical biopsy with microscopic examination by a pathologist remains the standard for diagnosing oral mucosal disease.¹⁵ The treatment decisions based on a definitive pathologic diagnosis, the biopsy is the most dependable technique that can establish the accurate diagnosis of a clinical lesion.¹⁶

Taking biopsies from different parts of a lesion, particularly if the lesion is extensive or if it shows

a variety of clinical presentations, can ensure reliable biopsy results. For example, for a 4-cm lesion, taking 2 biopsies from representative areas or those with different clinical appearances is justified. Using toluidine blue or direct fluorescence visualization can help a clinician highlight the most severe or significant change for biopsy. If dentists are unsure about the most appropriate site to biopsy, they should refer the patient to a clinician specializing in the field because a biopsy from an inappropriately selected

site could give both the patient and the dentist a false sense of security.¹⁷ Bataineh AB et al¹⁶ investigated attitude toward oral biopsy among general dental practitioners (GDPs) and found that majority of GDPs i.e. 78.6%, did not feel competent to perform oral biopsy and reported that lack of biopsy-related clinical experience and the preference to refer the patients to a specialist are probably the reasons for such results. Table 1 summarises various methods of performing biopsy as a diagnostic tool¹⁸ along with indications and contraindications.

	Punch	Scalpel	Punch	Brush
Tissue type	Epithelium	Epithelium	Epithelium	Epithelium
Site used	Limited – need direct access to approach from 90 degrees	Anywhere in the oral cavity	Anywhere in the oral cavity	Anywhere in the oral cavity
Advantages	Ideal for labial, buccal mucosa and tongue Simple to use Specimens are smaller, less patient discomfort post-procedure Often requires no sutures (silver nitrate cauterization)	Greater ability to cut sample to the width and depth needed Able to excise entire lesion (excisional biopsy)	Hemostasis – minimal bleeding Minimizes post-operative discomfort No sutures	Non-invasive Does not require local anesthetic Can be used for patients who refuse traditional biopsy
Disadvantages	Limited depth Difficult to access certain anatomical areas (maxillary buccal alveolar ridge and anterior lingual aspect of mandible) Difficult to biopsy freely moving tissues such as the floor of the mouth	More artefacts than in a punch biopsy (crushed, split or fragmented sample) Generally requires more sutures to close wound versus punch biopsy	May produce coagulative artifacts Hampers histological interpretations, especially at the margins Heat generates epithelial and connective tissue damage Thermal damage may simulate mild dysplastic changes	Sensitivity and specificity vary by study Not diagnostic Only determines if lesion is positive, atypical or negative Not to be used for suspected lichen planus, candidiasis, herpetic lesions Inadequate sampling not uncommon

CONCLUSION

The advent of adjunct tools for use as part of the conventional oral examination has been a driving force for change in the screening activity in community practices. Such devices presently include toluidine blue, brush cytology, reflectance visualization and, more recently, autofluorescence imaging. However, validation of these tools has been mainly restricted to high-risk referral clinic

settings with use by experienced personnel, with little work carried out in community settings.¹⁵ Dentists have ethical and legal obligations to be proactive in detecting oral disease.¹⁹ Dental procedures encompass a positive impact on patients’ oral health, systemic health, their appearance, and thus plays role in enhancing their self-confidence. But there is one more responsibility that makes a great difference in saving patients’ life i.e. oral mucosal screening.

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Source of support: Nil

Conflict of interest: None declared