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**DETECTION AND SCREENING OF PRECANCEROUS LESIONS**

***Abstract.** Oral cancers form a significant portion of the cancer burden seen in the world. Typically, they tend to be preceded by a premalignant state for a long time. This article discusses the various methods of detecting premalignant disorders commonly seen in daily practice. Also it attempts to review the current literature for screening methods and adjuncts such as toluidine blue, brush cytology, tissue chemiluminescence and autofluorescence. The recognition and management of these premalignant disorders and the understanding of their potential progression to oral cancer will minimise the morbidity and mortality from treatment and will have a direct effect on patient survival. Nowadays, many newer techniques are available to potentially assist in the screening of healthy patients for evidence of oral cancer.*

***Keywords:** oral premalignant lesion, detection, screening methods*

**Introduction.** An oral premalignant lesion is defined as any lesion or condition of the oral mucosa that has the potential for malignant transformation. This encompasses lesions such as leukoplakia, erythroplakia, erythroleukoplakia, lichen planus, oral sub-mucous fibrosis, palatal lesion of reverse cigar smoking and oral dysplasia.

Oral cancer screening is part of every oral health professional's (OHP) education and training. Unfortunately, it is often difficult for OHPs to differentiate high-risk oral premalignant lesions (OPLs) from benign lesions or normal tissue

variations. There is a need for development of visualization approaches that could aid detection of worrisome lesions and for the validation of such approaches in different settings. The identification of a potentially malignant disorder in an individual patient does not mean, however, that inevitable malignant transformation will take place. Many oral lesions do not progress over time, whilst others may resolve or regress spontaneously and it remains impossible in clinical practice to reliably predict the behaviour of any individual lesion or patient.

**Aim.** The overall goal of this study was to develop strategies for improving the detection of high-risk OPLs through enhanced visualization of clinical lesions.



Fig. 1. **Brush biopsy**



Fig. 2. **Staining the mucosa with Toluidine blue**

**Methods and materials.** The following data was documented for each study case for 10 patients: patient age and sex, clinical appearance (leukoplakia, erythroleukoplakia or erythroplakia) and anatomical site of treated oral mucosal lesions, original histopathology diagnoses for both incision together with details of follow-up.

*Inclusion criteria* for the study required that all clinical presentations of PMD disease had been new, with untreated oral mucosal lesions confirmed on provisional, incision biopsy diagnosis to be classifiable as an oral potentially malignant disorder, and with follow-up and clinical outcome data fully documented.

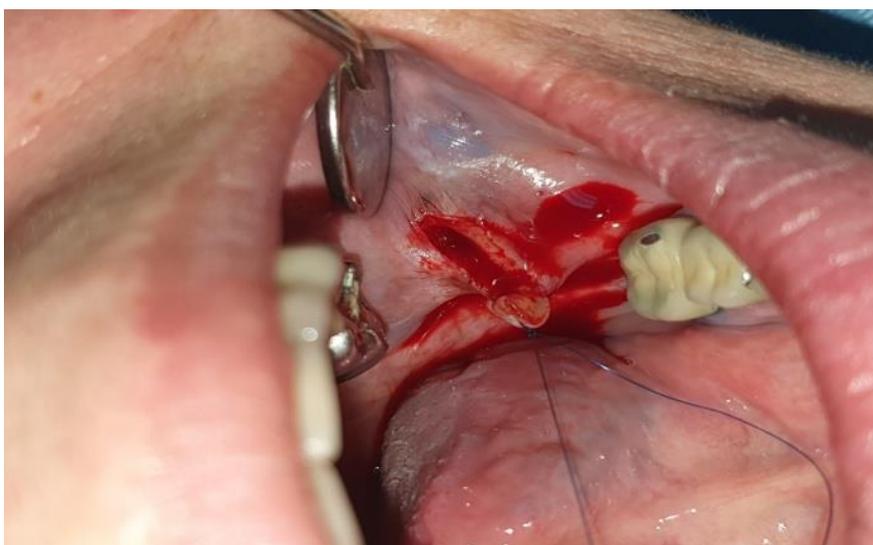


Fig. 3. **Incisional biopsy**

Specifically *excluded* were patients with a previous history of oral cancer or pre-cancer, those presenting with widespread multi-focal potentially malignant disease, and patients who had previously undergone radiotherapy treatment for a head and neck malignancy.

All incision biopsy procedures were carried out in Oral and Maxillofacial Surgery clinic in the University Dental clinic nr.2. Formalin-fixed tissue specimens were assessed via standardized histopathology examination by ex-perienced oral pathologists at the Department of Histopathology.

**Results.** Of the 10 lesions examined 4 were defined as clinically benign. While 6 were defined as suspected lesions (pre-malignant or malignant).

Lesions that showed dark blue staining, after toluidine blue application, were 7 out of the 10 while those considered negative were 3. The staining method was combined with chemiluminescence method.

Furthermore, 2 out of the total 3 negative lesions to toluidine blue staining were histologically benign lesions while 6 out of the 7 staining toluidine blue positive were histologically defined as pre-cancerous or cancerous lesions.



**Fig. 4. TB staining of lichen planus**



**Fig. 5. Chemiluminisence combined with toludine blue staining**

The results of the toluidine blue staining and histological findings are outlined in Table 1.

Table 1

**Correlation between clinical examination and toluidine  
blue staining in 10 oral lesions**

<b>Histology</b>	<b>Toluidine blue negative (%)</b>	<b>Toluidine blue positive (%)</b>
Benign	2	0
Mild dysplasia	1	1
Moderate dysplasia	0	4
Severe dysplasia	0	1
Carcinoma in situ	0	1
Invasive carcinoma	0	0
<b>Total</b>	<b>3</b>	<b>7</b>



Fig. 6. TB staining (navyblue)

Table 2 lists the anatomical site distribution for these lesions, confirming that floor of mouth and ventrolateral tongue sites were most frequently affected (in 6), with buccal mucosa the next most common site (4).

Table 2

**Anatomical sites distribution of all PMD lesions**

<b>Anatomical site</b>	<b>Nr. of patients</b>
Floor of the mouth	3
Lateral tongue	3
Buccal mucosa	2
Gingiva	1
Alveolus	1

Histological examinations revealed that 2/10 were benign lesions (hyperkeratosis, hyperparakeratosis, papillomatosis) and 8/10 were precancerous or cancerous lesions, 2 of the latter were mild dysplasia, 4 moderate dysplasia, 1 severe dysplasia, 1 *in situ* carcinomas.



Fig. 7. Biopsy tissue

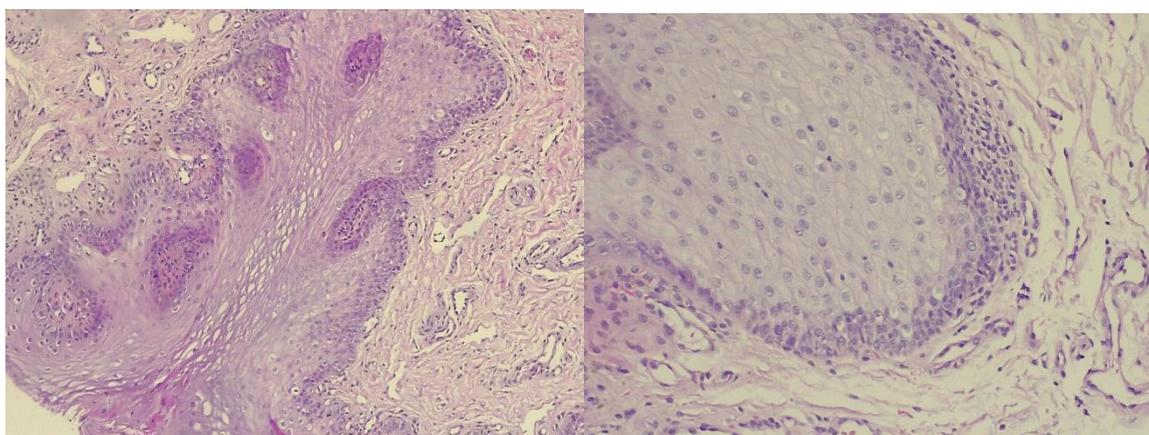


Fig. 8. Histopathological results

**Conclusions.** Staining with a vital dyes such as **toluidine blue** (TB), has improved the contrast of suspicious mucosal areas in normal tissue. Toluidine blue is useful in raising or confirming clinical suspicion of malignancy or pre-malignancy and has the capability to reduce the number of biopsies being done. It has been proved in our study that when the lesion stained faintly, it came out to be histopathologically negative in most cases. Though our findings suggest that toluidine blue staining may be considered as an adjunctive diagnostic tool for detecting dysplastic changes in the epithelium. As with **chemiluminescence**, it is used to identify alterations to tissue optics that is associated with morphological and

biochemical changes seen in premalignant diseases. Chemiluminescent light or ViziLite is useful as an adjunctive diagnostic tool for the detection of oral cancer and PMELs. Chemiluminescent light detects early epithelial dysplastic changes in high risk patients with clinically normal appearing oral mucosa.

Also the efficiency of different biopsy techniques for definitive histopathological diagnosis are extremely crucial. Tissue biopsy is an indispensable tool, as proper management of oral mucosal disease begins with diagnosis. Although a wide variety of biopsy techniques and devices exist, whether the techniques of the biopsy is aspiration biopsy, incisional biopsy, punch biopsy, brush biopsy or excisional biopsy, the ultimate underlying goal is to obtain a representative tissue sample to facilitate histologic interpretation, in which they all demonstrate superior accuracy and efficiency for histopathological diagnosis.

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