

Early Detection of Oral Cancer – Guidelines for Dental Practitioners

K H Awan¹, Shankargouda Patil², SA Islam³, Mohammed Jafer⁴

Contributors:

¹Assistant Professor, Department of Oral Medicine and Diagnostic Sciences, College of Dentistry, King Saud University, Riyadh, Saudi Arabia; ²Associate Professor, Department of Preventive Dental Sciences, College of Dentistry, Jazan University, Jazan, Kingdom of Saudi Arabia; ³Assistant Professor, Department of Community Dentistry, Karachi Medical and Dental College, Karachi, Pakistan; ⁴Lecturer and Head, Department of Preventive Dental Sciences, College of Dentistry, Jazan University, Jazan Kingdom of Saudi Arabia.

Correspondence:

Dr. Awan KH. Department of Oral Medicine and Diagnostic Sciences, College of Dentistry, King Saud University, Riyadh, Saudi Arabia. Tel: 966 1 467-7422. Fax: 966 1 467-9018. Email: kamranhabibawan@gmail.com

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Abstract:

Oral cancer is a common disease of global concern. It is known to be a devastating disease of tremendous consequence to the individual, to family, and to society. Early detection is the key in fight against oral cancer and has the potential to significantly reduce oral cancer deaths and morbidity. Screening for oral cancer by visual examination is simple, inexpensive and causes little discomfort. Adjunctive screening tools may be of added value and could be considered in conjunction with the annual oral cancer screening examination or at the time of identification of any suspicious lesion. The integration of an oral cancer screening examination into daily practice requires little additional time or expense in an already busy practice. The challenge to the dental profession is to ensure that all adult patients have a brief but regular oral cancer screening examination. A standardized step-by-step approach to oral cancer screening and to the evaluation of any mucosal lesion suspected to be premalignant or malignant is highly recommended.

Key Words: Adjunctive tools, oral cancer, oral precancer, screening

Introduction

Oral cancer is the eighth most frequent cancer in the world among men and the 14th among women, accounting for nearly 3% of all cancer cases worldwide.¹ Over 80% of oral cancers are associated with tobacco use.² Other known risk factors of oral cancers include alcohol and betel quid consumption. While historically the majority of patients have been found to be over the age of 40 at the time of detection, it does occur in those under this age. From a gender perspective, although the disease is more frequent in men than in women (1.8:1), the

(higher) sex ratio is narrowing slowly. This is most likely due to lifestyle changes, primarily an increase in the smoking habit among women over the latter part of the last century, although firm data on this link are lacking.

Despite numerous advances in treatment, the 5-year survival has remained approximately 50%.³ Oral cancer is particularly dangerous because in its early stages it is usually asymptomatic and may not be noticed by the patient. Deaths associated with oral cancer are particularly high because this cancer is all too frequently discovered late in its development.⁴ Often, it is discovered only after cancer has spread to regional lymph nodes or has some associated symptoms. Prognosis at this stage of detection is significantly worse than when it is caught early. As well as increased probability of metastasis, at these later stages, the primary tumor also has had time to invade more deeply into local structures.

Poor prognosis is also attributed to lack of knowledge toward oral cancer associated with both health care professionals and patients.^{5,6} Data from the studies carried out on medical and dental students, dentists, dental hygienists, physicians, and nurse practitioners demonstrate a strong association between their lack of knowledge and ability to perform standardized preventive and diagnostic procedures.^{7,8}

One approach to this problem would be to improve the ability of oral health care professionals to detect oral potentially malignant disorders (OPMD) at their earliest or most incipient stage. Such a goal could be achieved by increasing public awareness about the importance of regular oral screening or case finding examinations to identify small, otherwise asymptomatic cancers and precancers (secondary prevention). Another strategy would be the development and use of diagnostic aids that could help the general dentist or dental specialist more readily identify or assess persistent oral lesions of uncertain biologic significance.⁹ This paper is intended to provide guidance about the appropriate use of oral cancer screening techniques and to help dentists make informed decisions about screening for oral cancer in practice, which will eventually be used to facilitate clinical decision-making.

Patient History

The first step in the screening of oral cancer is to attain a detailed and comprehensive patient history that includes: A detailed medical history with listing of current medications

and medication allergies; a detailed dental history with past dental visits and treatments performed; a detailed history of oral habits and lifestyle with specific reference to frequency, quantity and duration of tobacco, betel quid, and alcohol consumption; any oral/dental associated signs and/or symptoms.

Systematic Visual Oral Examination

For a systematic visual oral examination, a health practitioner visually examines both extraoral and intraoral region with the incandescent light source, gauze, mouth mirror, and magnification.

Extraoral examination

The extraoral examination includes: Inspection of the head and neck region for any asymmetry, tenderness, or swelling; palpation of the lymph nodes (submental, submandibular, preauricular, supraclavicular, cervical, and occipital); inspection and palpation of the lips and perioral tissues for any abnormalities.

Intraoral examination

The intraoral examination consists of systematic inspection and palpation of all oral soft tissues, with particular attention to the high-risk sites (lateral and ventral surfaces of tongue, floor of the mouth and soft palate) for the presence of OPMD and/or oral cancer.

Lesion assessment

This includes a detailed evaluation of each oral lesion with particular attention to specific characteristics that is duration, size, color, site, texture, and any associated symptoms. The lesions which need particular attention are white, red, mixed white and red patches, and/or any ulcerated lesions with a history of more than 2 weeks.

Documentation

At the time of initial assessment and at each follow-up appointment, it is recommended that in addition to writing all the clinical notes, an image of the clinically visible oral lesion be obtained as well. This not only serves the medico-legal purpose but also helps the health practitioner to compare the progress of the lesion over a period of time and to modify or continue the treatment plan accordingly.

Adjunctive Tools for Screening

A number of chair-side adjunctive tools have been developed to help practitioners with oral cancer screening with the aim of diagnosing high-risk lesions. Although these tools are not diagnostic alone, they do have the aptitude to identify OPMD, enhance visualization, and assist in biopsy site selection.¹⁰⁻¹² These tools are complementary to and not a replacement to a comprehensive history and conventional oral examination and, therefore, should be used with caution in the background of proper training and experience.

Light-based screening adjuncts

Autofluorescence, one of the potential tools, works on the principle that certain biofluorophores present within the tissue become fluorescent on excitation with a suitable wavelength (400-460 nm) light source. In contrast, diseased tissues lose fluorescence due to disruption in the distribution of these biofluorophores, and appear darker in color. The technology utilizes a hand-held device, VELscope® that emits a cone of blue-light, that when directed into the oral cavity, causes normal healthy mucosa to emit an apple-green fluorescence while the altered mucosa appears dark brown to black. There is evidence in the published literature that VELscope is useful in confirming the presence of oral leukoplakia and erythroplakia and other oral mucosal disorders.^{10,13}

Chemiluminescence, another optical-based test has recently been adapted for use in the oral cavity with the development of a hand-held device, namely ViziLite system®. The system is said to detect the mucosal tissues undergoing abnormal metabolic or structural changes that by their nature have different absorbance and reflectance profiles when exposed to various forms of light sources – as a result enhancing the identification of oral mucosal abnormalities. The device can be used as a general oral mucosal examination system and may, in particular, improve the visualization of leukoplakias.¹¹

Vital tissue staining

Toluidine blue (TBlue) has been used for more than four decades as an adjunctive test for the detection of OPMD and/or oral cancers. TBlue is a cationic metachromatic dye that selectively binds *in vivo* to acidic tissue components (sulfate, carboxylate, and phosphate radicals) of DNA and RNA, tissues undergoing rapid cell division (such as inflammatory, regenerative, and neoplastic tissues) and also may be retained in intracellular spaces of the dysplastic epithelium.¹⁴⁻¹⁶ The binding results in the staining of abnormal tissue with a blue coloration that contrasts with adjacent normal mucosa. Its use *in vivo* is based on the fact that dysplastic cells contain quantitatively more nucleic acids than normal tissues.¹⁷ Previously, the system was available in the form of an oral rinse; however, recently it has been marketed in the form of swab along with ViziLite as ViziLite Plus® – an oral lesion identification and marking system which has found to be more convenient for use by the clinicians and user-friendly for our patients.¹²

Diagnostic Biopsy

The current gold standard for the assessment of OPMD and to establish a definitive diagnosis of oral cancer is to perform a tissue biopsy followed by histopathological analysis. Any white, red, mixed white and red patch, and/or ulcer that have not resolved for more than 2 weeks following removal of identified local irritants such as trauma, infection or inflammation necessitate a biopsy. If the biopsy confirms the presence of dysplasia, an oral risk assessment is recommended to determine

appropriate management. This includes advice and support on risk-habit cessation and may range from long-term monitoring to medical and/or surgical therapy.

Level of Evidence

Because of the cost implications and the potential for over-diagnosis (false positive result), strict criteria are needed to evaluate screening programs and to determine their appropriateness before they are implemented. In the UK, for example, the National Screening Committee has listed 22 criteria (Table 1) that should be met before a screening program is introduced.¹⁸ Figure 1 illustrates the recommended pathway for the referral of OPMD and oral cancer.

The standard of scientific evidence required to prove that screening is beneficial to the patient is extremely demanding. There are a number of characteristics that should be considered in the development of an ideal screening test (Table 2). The ideal is to have evidence from a prospective randomized control trial to show that subjects which are offered screening have a reduced mortality rate, as compared

to those who were not offered screening. A study to show this needs to be extremely large and requires a long follow-

Table 1: Criteria for the implementation of a screening program.¹⁹

• The disease must be a significant health problem
• An accepted treatment must be available for patients
• Facilities for diagnosis and treatment must be available
• There must be a recognizable latent or early symptomatic stage
• An appropriate test must be available
• The test should be acceptable to the population
• The natural history of the condition should be sufficiently understood
• There should be an agreed policy on treatment priority
• The screening program should be cost-effective
• The screening process should be a continuing process and not a 'once and for all' project

Table 2: Characteristics of a good screening test.

• Be simple, safe, and acceptable to general population
• Detect disease in the early stages
• Specifically detect those lesions which are likely to progress
• Detect lesions which are treatable or where an intervention will prevent progression
• Have a high positive predictive value and low false negatives (high sensitivity)

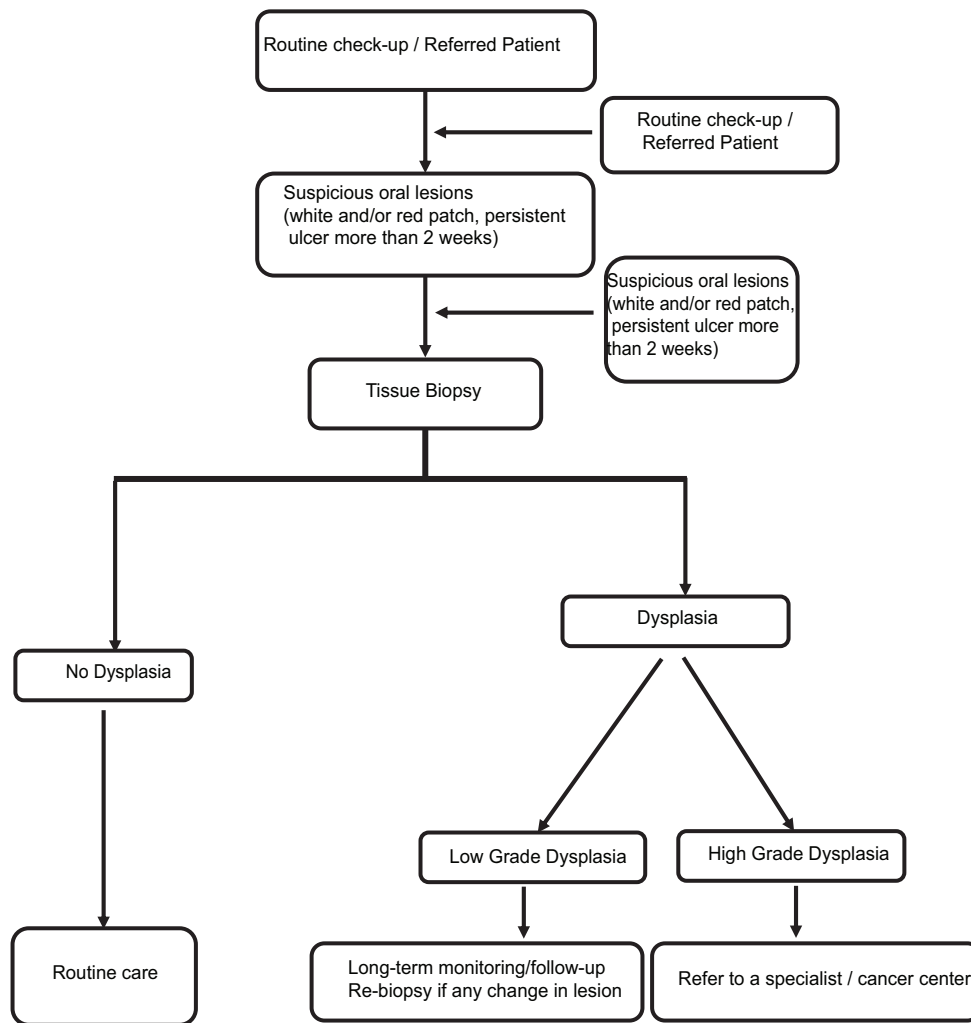


Figure 1: Recommended referral pathway for oral potentially malignant disorders and oral cancer.

up. Screening for breast cancer by mammography and for colorectal cancer by fecal occult blood testing are the only cancer screening procedures for the general population supported by this ideal best evidence.

Oral cancer is a less frequent problem compare to breast or colorectal cancer in developed countries, and as a result, no large-scale prospective studies have been done. Furthermore, it will take many years to produce mortality results if a study to assess the use of the newer technologies in oral cancer screening is started now.

Evidence of benefit may also be obtained by the demonstration that screening result in early cancer detection with better clinical results, or from observational studies comparing screened and unscreened subjects. The most long-established cancer screening program, for cervical cancer by Pap smears, is not supported by randomized trials but is supported by consistent evidence from these weaker types of study design.

For oral cancer screening, there is, in fact, one such randomized trial evidence, which was carried out in India where more than 95,000 people were offered oral visual inspection by community health workers, with a similar number of people not offered screening, and up to 12 years monitoring of mortality results.²⁰ Even with only 63% of people found with lesions coming back for the follow-up assessment, deaths from oral cancer were reduced by 21% in the group offered screening compared to the control group. In addition, in users of tobacco or alcohol the reduction was even further (34%) and statistically significant. No such extensive trials of oral cancer screening in developed countries have been performed.

The clinical recommendations presented here for dental practitioners address opportunistic screening, that is, screening in the context of a clinical assessment linked to routine care. The recommendation that oral cancer screening should be offered in the context of routine dental care is justified by the simplicity of the procedure and the minimal risks involved, compared to the potential benefits.

Summary

To summarize, there is no definitive scientific evidence of the ultimate benefit of oral cancer screening, as there are not many randomized control trials performed. However, the results of the Indian trial and other sources of evidence are encouraging. The visual oral examination is simple and risk-free, and can identify OPMD and early-stage oral cancer. The addition of methods such as autofluorescence, chemiluminescence, TBlue and a number of other developing procedures, adds to that potential. Dental practitioners are encouraged to take part in further research and evaluation studies where they have the opportunity.

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