

Competency of Dental Students to Detect Lesions Suspicious for Oral Cancer and Oral Potentially Malignant Disorders

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Abstract

This study aimed to assess the ability of dental students to identify, describe, classify/diagnose and report oral mucosal lesions particularly those with suspicious for malignancy.

Retrospective analysis of mucosal lesions reported by students during their routine dental examination and treatment was undertaken. The analysis involved classification of the reported lesions, sites of the reported lesions, the accuracy of lesion's description, the accuracy of diagnosis and the capability of the students to recognize features suggestive of malignancy.

350 dental year 4-undergraduate students reported 843 lesions, over a period of 10 months. Around one-fifth of the reported lesions (n=181) were oral potentially malignant disorders. On clinical evaluation, students suspected 76% of these cases to be of malignant nature. The reported lesions were mainly related to color change (53.4%), followed by consistency changes (e.g., lumps), and visually noted changes on the surfaces of the tongue. Students reached an optimal diagnosis in more than half of the cases (59%). However, most of the students (57%) failed to provide the minimum expected standard for describing reported lesions.

Dental students showed good capability to identify, and report various changes in the oral mucosa, including most lesions with malignant potential. This exercise may serve as a model for students training towards competency in the early detection of oral cancer and oral potentially malignant disorders. Offering dental students' feedback in the form of immediate remediation is warranted to improve their clinical diagnostic skills in recognizing changes suggestive of malignant transformation.

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Introduction

Cancer of the oral cavity has an increasing incidence in specific geographic regions worldwide.¹ It is projected that the number of new oral cancer cases in the MENA region in 2030 to be increased by 100%, compared to about 50% worldwide.² Over the years, oral cancer-related mortality has shown an active link to the stage of the disease at the time of the initial diagnosis. Specifically, late diagnosis and advanced stage disease have ultimately associated with poor prognosis and vice versa.^{3,4}

Most oral cancer cases are preceded by a group of lesions and conditions that are characterized by an increased likelihood of cancer progression and are termed oral potentially malignant disorders (OPMDs). OPMDs may present clinically as white, red, or ulcerative lesions.⁵ Early detection has always been considered as a paramount strategy in oral cancer prevention.^{6,7} Dentists and other healthcare providers can play a significant role in the early detection of oral cancer. Given that oral cavity is accessible to visual examination, and the regular oral exam showed reliability in detecting OPMDs; therefore, mastering the visual exam in recognizing mucosal changes is an essential competency for new dental graduates. Furthermore, it is well documented that the lack of knowledge, insufficient training, and inaccuracy of primary health care providers in detecting the early changes of oral malignancy have contributed to delay in the diagnosis of oral cancer.^{8,9} Moreover,

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several studies conducted in different geographic regions around the globe have revealed deficits in the knowledge, awareness, and attitudes of dental students regarding oral cancer lesions and OPMDs. These studies recommended further analysis of the competency of dental students to perform a proper oral examination and identify oral lesions with signs of abnormality and potential for malignant transformation.¹⁰⁻¹⁴

This paper, therefore, aimed to assess the ability of dental students to identify, describe, diagnose, and report various oral mucosal changes with a particular focus on oral potentially malignant disorders and oral cancer in a real-time clinical setting.

Materials and methods

This study is a retrospective, descriptive analysis of oral mucosal lesions reported by dental students attended oral medicine clinics between September 2015 and June 2016, at the College of Dentistry, Ajman University (AU), United Arab Emirates. The study was prepared according to the STROBE statement and was approved by the Research Institutional Review committee in AU (REF: SS-2015/2016-06). All procedures were undertaken following the principles of the Helsinki Declaration.

A special form for reporting mucosal abnormalities was designed as part of the formal student's clinical assessment in oral medicine clinics. The form retrieves the following patient information: demographics, history, and a relationship of reported lesions to the presenting complaint, in addition to lesion characteristics (morphology, site, and size). The form has also details on the differential diagnosis, further investigations, and suggestive treatment and follow-up intervals if required. Once the student examines the referred patient and fills in the form, the supervising oral medicine or/and maxillofacial surgery specialists re-examine the patient and then reviews the case for further investigations and final diagnosis. The student's reports are scored by the attendant specialist on a scale from 1 to 3 based on specified rubrics as detailed in Table 1.

The reported oral mucosal lesions were classified morphologically into three groups; chronic ulcerations, lumps, and color-changed lesions. Literally, lesions were considered clinically suspicious for malignancy when one of

the following characteristics was reported; long-standing, non-healing ulcer with indurated margins; lesion on either lateral border/ventral surface of tongue or floor of mouth; indurated lesion; homogenous and non-homogenous white patches; ill-defined red velvety lesion; and lump with irregularly ulcerated surface. Cases of the confirmed diagnosis of mucosal variations of normality and hard tissue lesions were excluded. Data were analyzed using the Statistical Package for Social Sciences software version 22.0 (SPSS Inc., Chicago, IL, USA). Descriptive data were generated. Pearson's chi-squared test was used to examine differences between the variables. A p-value of <0.05 was considered statistically significant. Kappa testing was undertaken to examine the inter-examiner reliability.

Results

Three hundred and fifty students presented 994 cases of which 843(84.8%) eligible reports were included in the study then, 151 (15.2%) reports described mucosal variations of normality. Four-handed and seventy-eight of the reported lesions were not the primary reason for the dental visit. The most frequently reported student's observation was the color change to the mucosa (70.8%), followed by

the ulceration and lump (19.5% and 9.6%) respectively (Table 2). The reports of the lesion that might be linked to a risk of malignancy were 635 (75.3%).

More than half of the reports (460) described lesions either on buccal mucosa or tongue (Table 3). The students submitted 408 reports (59%) where they showed a systematic approach to reach an optimal diagnosis (Figure 1c).

Grading the reports			Grouping for the oral lesions with their description			
Accurately described lesions	Diagnosis score	Suspicion of malignancy	Ulcer	Tongue	White/red lesions	Lump
'less than 50%, '50% or more described, 'more than 85% described	'Fail to reach, 'Incomplete element, 'Optimal	'Suspected, 'not suspected 'Lesions with no malignant potential	'site, size, shape, 'Base 'Edge: 'Depth, 'Discharge 'Surroundings 'Symptomatic	*Site and Surface Size, *Overlying mucosa *presence of ulceration, white patches *Elevation, *Symptomatic *induration	*Site, *Size, *Overlying mucosa "rub off , slough", *Outline / border, *Elevation, *Symptomatic, *Disappear on stretching of mucosa	*Site, *Size, *Surface, *Shape, * Edge, **Tenderness, Consistency *Plasticity

Table 1. The grading of the student report and grouping of the reported lesions and their criteria for description.

		Accuracy of lesions description			Suspicion of malignancy			
		Poor description	Substandard description	Adequate description	Suspected	Not suspected	Non applicable	Total
Type/nature	Ulcer	54	57	13	13	8	103	124 (19.5%)
	Lump	34	25	2	23	3	35	61 (9.6%)
	Change in color	275	143	32	97	30	323	450 (70.8%)
Total		363 (57.2%)	225 (35.4%)	47 (7.4%)	133 (20.9%)	41 (6.5%)	461 (72.6%)	635 (100%)

Table 2. the accuracy of lesions description in relation to the capability to reach optimal diagnosis.

			Oral Sites											
			Tongue	lips	Buccal mucosa	Labial mucosa	FOM	Palate	Ridge	Gingiva	Combined	Not mentioned	Angle of lips	Alveolar mucosa
Suspicion of malignancy	Suspected	Count	9 (6.6%)	3 (2.2%)	49 (35.8%)	17 (12.4%)	0 (0%)	7 (5.1%)	5 (3.6%)	17 (12.4%)	13 (9.5%)	15 (10.9%)	1 (0.7%)	1 (0.7%)
		% within location	3.9%	8.6%	21.2%	22.1%	0.0%	31.8%	50.0%	14.5%	31.0%	29.4%	5.6%	16.7%
Suspicion of malignancy	Not suspected	Count	3 (6.8%)	1 (2.3%)	12 (27.3%)	4 (9.1%)	2 (4.5%)	7 (15.9%)	0 (0%)	3 (6.8%)	4 (9.1%)	5 (11.4%)	1 (2.3%)	2 (4.5%)
		% within location	1.3%	2.9%	5.2%	5.2%	40.0%	31.8%	0.0%	2.6%	9.5%	9.8%	5.6%	33.3%
Suspicion of malignancy	Non applicable	Count	217 (32.8%)	31 (4.7%)	170 (25.7%)	56 (8.5%)	3 (0.5%)	8 (1.2%)	5 (0.8%)	97 (14.7%)	25 (3.8%)	31 (4.7%)	16 (2.4%)	3 (0.5%)
		% within location	94.8%	88.6%	73.6%	72.7%	60.0%	36.4%	50.0%	82.9%	59.5%	60.8%	88.9%	50.0%
Total		Count	229 (27.2%)	35 (4.2%)	231 (27.4%)	77 (9.1%)	5 (0.6%)	22 (2.6%)	10 (1.2%)	117 (13.9%)	42 (5.0%)	51 (6.0%)	18 (2.1%)	6 (0.7%)

Table 3. Cross tabulation between suspicious for malignancy and various oral sites.

The accuracy of lesion description

More than half of the reports (388) showed poor description of the lesions compared to the 57 (8.2%) reports showed adequate and comprehensive description (Fig.1B). When the authors attempted to relate the accuracy of description to the diagnosis score, a high significance noted, with a clear, direct relationship, i.e., Whenever the lesion is adequately described, the ability to reach an

optimal diagnosis was higher (59.7%). However, in around half of the reports (568) despite their inability to adequately describe the lesions, they reached the appropriate final diagnosis. Furthermore, female students showed a higher capability to reach an optimal diagnosis score (75.3%) and provided a higher rate of accurate lesion's description (85.5%) when compared to the male students (Table 2). The students were more efficient in describing the ulcerative

conditions as compared to the other lesion types. Similarly, they best described lesions they noted either on the tongue (36.2%) or buccal mucosa (30.4%).

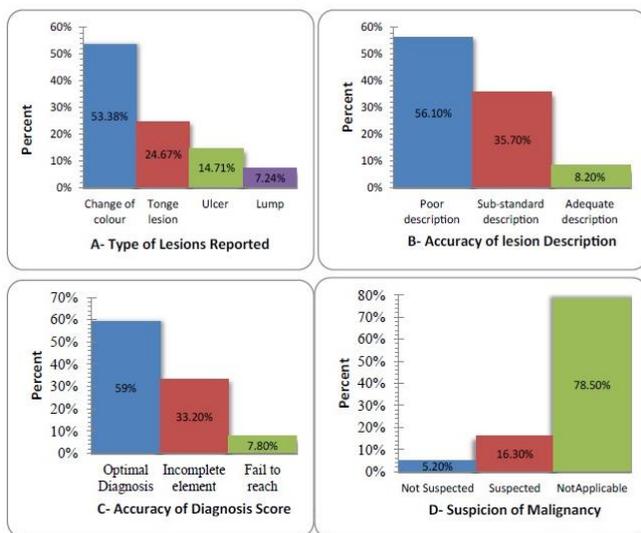


Figure 1. Diagrammatic presentations for variety of lesions reported (A), accuracy of lesion description (B), Accuracy of diagnosis (C) and suspicion of malignancy (D).

Type of the lesions

The alteration in mucosal colors was presented by more than two-thirds (597) of the submitted reports (Fig.1A). The variation like the lesions did not affect the ability of students to reach the diagnosis ($P=0.939$). The patient presenting complaints did not distract the attention or prevent the student identifying mucosal changes, as the majority of the reports (686) were not related to the reason of the patients visiting the clinics. On the other hand, painful ulcers were the most lesions led to the patient presentation (34%) and were frequently reported on the buccal mucosa (27.4%).

Suspicion for malignancy

The students were able to report 181 (21.5%) lesions with a potential link to risk of malignancy. In about three quarters (133) of these reports, the students were able to suspect the potential risk (Fig.1D). Student gender did not influence their ability to suspect malignancy risk of oral mucosal changes ($P=0.766$). The relationship to the presenting complaint did not disturb the inclination of students to suspect malignancy of the lesions ($P= 0.643$). The suspicion of malignancy was linked to following

observations;1) the color: changes in color as the students suspected the white lesions (62.9%) as compared brown or dark brown or black color mucosal changes (27.8%);2) site: lesions noted on the buccal mucosa (35.8%) had the highest chance to be suspected as compared to other sites in the oral cavity.

Discussion

Cancer is one of the leading causes of death in the Middle East and North Africa (MENA) region. The newly diagnosed oral cancer cases in 2012 in the MENA region were around 9000, while the associated deaths exceeded 3500.² Dentists in the MENA region as part of the healthcare provider team share the responsibility to combat this growing health burden by adopting an early changes detection approach. In fact, oral cancer clinically presents in different forms including white and red patches, non-healing ulcers and indurated lesions.¹⁵ Recognition of these oral mucosal changes that are crucial for the suspicion for malignancy. In point of fact, dental professionals are in a unique position to observe patients for symptoms and signs related to OPMDs, because they may see their patients frequently for various dental services.¹⁶ Interestingly, it is well proven that conventional oral examination is adequate for detection of oral cancer and potentially malignant lesions.¹⁷ In this study, the students' competency to detect and diagnose oral mucosal changes in clinical practice has been evaluated. Most of the OPMDs (133 out of 181) in this study were identified during the dental examination. About 70% of these disorders were asymptomatic and not related to the presenting complaint of the patients, which indicates that our participated students were able to detect mucosal abnormalities quiet efficiently. This is in contrast to the previous Nigerian survey-based study when students believed that oral malignancies are always or sometimes associated with pain.¹⁸ The caution of comparing studies with different methodology is considered before a conclusion is drawn.

However, current teaching methods of oral surgery, oral medicine, and oral pathology primarily based on extensive didactic lectures and theoretical tutorials with limited practical/clinical components. Students in this study were able to identify and report lesions that showed a change of color, lumps, and ulcers,

regardless of the location in the oral cavity. It has been found that lingual mucosal changes, ulcers, and lesions found in the buccal mucosa had been adequately described as compared to the other sites, it could be due to the accessibility, with less variable presentations and clear descriptive criteria and presenting features. Out of 181 cases that may be linked to the potential for malignancy, our participants were able to note and report around two-thirds of them, which is comparable to the outcomes of previous studies.^{19,20} In this study, female participants were able to describe the lesions better and reach diagnosis more systematically as compared to males. However, there was no influence of gender on the ability to suspect OPMDs; which is in contrast to the previous study carried out in India, where male students showed slightly more average knowledge compared to females.²¹ Concerning the nature of OPMDs, the white lesions were the main lesions considered by our participated students. This was in agreement with several previous papers of various methodologies.^{18,20-23}

On the other hand, screening studies have proven that oral cancer screening is cost-effective and cheaper when compared to the breast cancer screening program²⁰ which come to an advantage to this study, as all the cases are reported by the students during practicing various dental treatment, indicates a very low-cost form of screening that raises oral cancer awareness for both students and patients.

Conclusions

In conclusion, the students in this study showed the capacity to identify various oral mucosal changes and suspect ones with signs of potential malignancy, with an acceptable failure rate about their limited clinical experience. Additional efforts are required to improve the detailed description of lesions to facilitate referral of such diseases. In addition, it is recommended that at least opportunistic screening and early detection model should be considered by dental schools especially in countries where oral cancer prevalence is relatively high, in order to improve their ability to manage OPMDs in clinical practice.

Declaration of Interest

The authors report no conflict of interest.

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