

Screening Oral Cancer or Premalignant Lesions of Oral Cavity by VELscope Method at Dentistry

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ORIGINAL RESEARCH ARTICLE

Abstract

Objective: The aim of the study was to evaluate the effectiveness of the VELscope for a possible screening program in dental offices by recognizing dysplastic and/or neoplastic changes in oral mucosal lesions.

Material and methods: In the present study, 92 patients were evaluated by conventional oral examination, after which the direct evaluation of visual fluorescence (DVFE) was performed using VELscope VX, performed by the same dentist, in a private dental clinic and 12 has oral lesions.

Results: The average age of the patients with oral lesions was 64.57 years, the distribution by sex was equal, 4 lesions located on the tongue, 3 on the gums, 2 on the palatine mucosa and one on the floor.

Conclusions: VELscope VX offers the possibility of presumptive diagnosis of greater accuracy, which can help guide the patient to different methods of treatment, be they surgical, radioactive or chemotherapy.

Keywords: early diagnosis, oral cancer, potential oral malignity, tissue autofluorescence VELscope VX.

I. INTRODUCTION

The worldwide incidence of oral cancer is almost 3% of all malignancies and this is creating a remarkable public health problem [1]. Oral cavity and pharynx cancer have an increasing incidence from one year to another. Early detection of these pathologies using VELscope represent an important step in the prevention and early detection of various malignant and premalignant conditions located in the oral cavity [2, 3]. Obtaining an early oral cancer diagnosis through visual inspection (VELscope VX Method) followed by

histopathological confirmation will be a pivotal step for reducing rates of morbidity and mortality.

Risk factors for oral cancer are well known and include tobacco and alcohol use [4]. Despite the established risk factors and advances in treatment, the 5-year survival for oral squamous cell carcinoma (OSCC) associated with tobacco and alcohol use has remained consistently poor for the last forty years [5].

The VELscope VX technology stimulates the epithelial cells and stroma with a blue light (400-460 nm). It represents the self-fluorescence of the tissues that allows detection of changes morphology and composition of the tissues in a non-invasive manner, which does not replace the oral examination and scalpel biopsy, which remains the golden standard of diagnosis. The long-pass filter transmits fluorescence with wavelengths exceeding 480 nm and blocks blue excitation fluorescence with wavelengths of less than 470 nm. These systems display healthy mucosa tissues as apple green fluorescence, which is termed autofluorescence. In contrast, oral cancer and oral dysplasia lesions are visualized as a loss of autofluorescence indicated by black areas. [6-8].

The VELscope cannot diagnose cancer directly, it can be done only with the help of biopsy and histopathological examination, but it is an adjunct to oral examination and is considered by field specialists field a fantastic non-invasive screening device for early detection of premalignant lesions, or malignant, which are not visible to the naked eye [9-12]. Neoplastic lesions are expected to cause in fluorescence visualization loss and appear as a dark area.

The most important advantages of using the VELscope is that it is a small and portable device and has a short detection time, which makes the detection of cancer much easier, making it easier for the doctor to observe abnormalities in the oral cavity, the light immediately showing if there are obvious signs of oral cancer [13]. Patients readily accept this

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exploration because it has a short, fast, and non-invasive exposure time.

The use of the VELscope is based on the early detection of dysplastic cells, which have a different absorption capacity than normal cells, thus highlighting the smallest early tissue changes [14-16].

The aim of our study was to evaluate the efficacy of the VELscope VX for a possible screening program in dental offices by recognizing dysplastic and/or neoplastic changes in oral mucosal lesions.

II. MATERIAL AND METHODS

In the present study, 92 patients were evaluated by conventional oral examination, after which the direct evaluation of visual fluorescence (DVFE) was performed using VELscope VX, performed by the same dentist, in a private dental clinic and 12 has oral lesions.

In patients who have presented clinically suspicious areas on conventional oral examination or with DVFE positive i.e., loss of visual fluorescence (VFL) the association between COE and DVFE was evaluated and compared with histopathology. During the study, all visual and tactile intraoral examinations followed by fluorescence examinations were performed by the same clinician (dentist).

All subjects underwent an inspection during the conventional oral examination for the following: lips; oral and labial mucosa; dorsal, ventral, and lateral sides of the tongue; the floor of the mouth; hard and soft palate; uvula and oropharynx. The lesions were examined under conventional aerial light and then examined using VELscope Vx. Each examination was recorded with the digital camera. For fluorescence photography, the camera settings include 2x digital zoom, minimal optical zoom, 7mm focal length and 3264 × 2448-pixel image size.

All participants received information about oral cancer screening and signed an informed consent.

III. RESULTS AND DISCUSSION

A. Results

The average age of the patients with oral lesions was 64.57 years, the distribution by sex was equal, 4 lesions located on the tongue, 3 on the gums, 2 on the palatine mucosa and one on the floor. (Table 1)

Velscope VX is a system for diagnosing the oral cavity to detect mucosal abnormalities in time. Early detection allows for early-stage diagnosis and successful treatment of the disease, increasing the survival rate and maintaining a healthy life.

Table 1 Characteristics of studied patients

Patient Nr.	Age	Sex	Injury location	Clinical amendments	Intensity and magnitude of loss of visual fluorescence	Histopathological examination
1	34	F	The lateral face of the tongue (picture 1)	Well-defined erythematous area	Well defined dark area	
2	43	F	The side of the tongue (picture 2)	Tumor about 1 cm in diameter, erythematous area	Well defined dark area	
3	48	M	The right antero-lateral face of the tongue (picture 3)	Partly erythematous partially delimited	Well defined dark area	
4	53	M	The palatine mucosa (picture 4)	Partly erythematous partially delimited	Well defined dark area	
5	76	F	The lingual vermilium (picture 5)	Partially well demarcated, erythematous, ulcerated area	Well defined dark area	Squamous cell carcinoma
6	68	M	The upper left gum	Partly erythematous well demarcated	Well defined dark area	
7	51	F	The palate is soft and hard	Partially demarcated, erythematous area	Well defined dark area	
8	46	M	The dorsal face tongue	Partly erythematous well demarcated	Well defined dark area	
9	73	M	The upper anterior gum	Partially erythematous poorly delimited	Slightly demarcated area	
10	82	F	The tough palate	Partly erythematous well demarcated	Well defined dark area	
11	68	M	The lower right gum	Partly erythematous well demarcated	Well defined dark area	
12	64	F	The floor of the mouth	Partly erythematous well demarcated	Well defined dark area	

The first patient of this study was a 34-year-old female, from urban area, where a cellular change was noticed on the side of the tongue (figure 1b), which could not be observed at the oral examination (figure 1a).

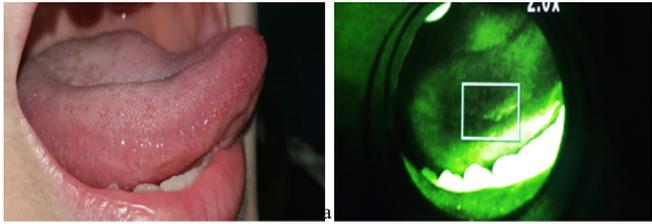


Figure 1: a) Conventional oral examination showing a small undefined, dome-shaped swelling on the antero-lateral of the tongue; b) VELscope VX examination showing well defined dark area on the right antero-lateral face of tongue.

At the second patient, female, 43 years old, from urban area, was observed at oral examination a tumor formation with a diameter of approximately 1 cm on the lateral face of the tongue (figure 2a), which was confirmed at VELscope VX examination like a well-defined dark area (figure 2b).

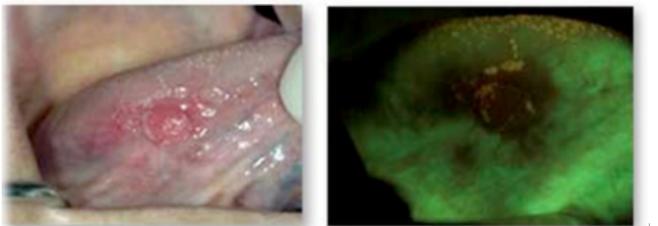


Figure 2: a) Conventional oral examination showing, dome-shaped erythematous area with a diameter of approximately 1 cm on the lateral face of the tongue on the antero-lateral of the tongue; b) VELscope VX examination showing well defined dark area on the right antero-lateral face of tongue.

At third male patient, 48-year-old, was observed at oral examination one tongue lesion on the antero-lateral face of the tongue (figure 3a), which was confirmed by VELscope VX examination like a well-defined dark area (figure 3b).

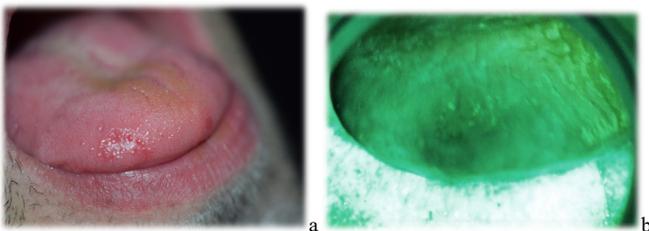


Figure 3: a) Conventional oral examination showing a well-defined, dome-shaped swelling on the antero-lateral of the tongue; b) VELscope VX examination showing well defined dark area.

51-year patient, female, with a partially demarcated, erythematous area on the soft and hard tissue palate on the oral examination (figure 4a), and well-defined dark area at VELscope VX examination (figure 4b).

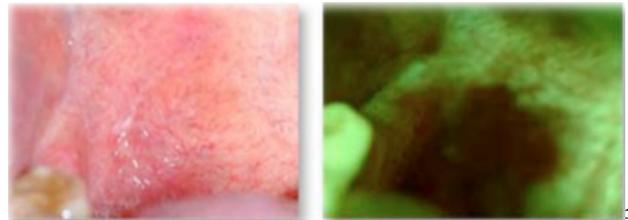


Figure 4: a) Conventional oral examination showing a partially demarcated, erythematous area on the soft and hard palate; b) VELscope VX examination showing well defined dark area.

Patient with malignant tumor proliferation in the vermilion of the lower lip, for a 76-year-old patient, living in rural area, and being exposed to UV radiation 8 months a year, who was diagnosed with squamous cell carcinoma after biopsy and histopathological examination cell language. (Figure 5)



Figure 5: VELscope VX examination shows a well-defined dark area on the lower lip.

B. Discussion

Detection of premalignant oral lesions before they progress to malignancy is necessary to improve survival rates for oral cancer. [17] Several studies have shown that VELscope Vx is a simple, non-invasive, and inexpensive test of the oral mucosa that can help the experienced clinician find pre-malignant oral / malignant lesions in the early stages and the correct location for biopsies in the altered mucosa. [18]

The use of immunofluorescent light as a diagnostic tool for lesions of the oral and cervical cavity cannot be effective without a subsequent biopsy and histopathological examination, but its use demonstrates its effectiveness in identifying premalignant / malignant lesions that require immediate follow-up, so that a diagnosis at an early stage and increase the survival and success rate of treatment [19].

The ability to use fluorescent light is yet to be fully explored; however, encourages three potential clinical directions for the use of this assessment method:

- (I) early diagnosis of premalignant lesions and clinical occult cancers.
- (II) early identification of the recurrent disease, either as a second primary tumor located elsewhere in the oral cavity or as a recurrence at the site of the treated lesion.
- (III) better delimitation of the surgical margin in malignant lesions.

In the literature, the use of the VELscope Vx is considered to have limited ability to discriminate high-risk lesions from malignancy from those without risk of malignancy. In any case, conventional visual inspection under normal incandescent light, followed by biopsy of suspicious lesions, will remain the gold standard for the immediate future. [20] Future approaches to optical imaging could involve a real-time quantitative assessment to determine a diagnosis of oral mucosal lesions, rather than simply highlighting the presence of abnormalities, making the possibility of "optical biopsy" a clinical reality. [21]

While interacting with patients, the doctor must understand that they have an unnatural behavior, determined by the mental discomfort generated by the suffering, when it is prolonged, there is also a depressing feeling of distrust in the doctor and in the possibilities of medicine. Through his attitude towards the patient, through the balanced optimism he must show, the doctor will gain the patient's trust, restoring the optimism he needs in the healing process, and especially when we refer to tumor pathology. The doctor-patient relationship is an asymmetric one, i.e., it refers to two people with different social status, with different requirements and expectations. The doctor must establish a collaborative relationship with the patient, favoring a harmonious relationship based on his mental closeness. We must not forget that our patients are not just mouths to repair, but human beings to be respected, and most cannot afford the costs of consultations for diagnosis and dental treatment, which is worrying, because the material status should not take precedence over health. In general, and implicitly of the oral health of the population. Accessibility to dental services, but also addressability is in a close relationship with the educational level in general and for health, especially for the Oro-Dental. Where accessibility is low, even if there is high addressability, the morbidity of a disease has high values [22].

IV. CONCLUSION

As an important benefit of using the VELscope VX system for patients is time saving, the results are obtained in two minutes by a non-invasive scan, without pain for the patient, representing a much more accurate method for detecting abnormal tissues in the oral cavity, compared with macroscopic visual examination of the oral mucosa.

VELscope VX offers the possibility of presumptive diagnosis of greater accuracy, which can help guide the patient

to different methods of treatment, be they surgical, radioactive or chemotherapy.

The vision of detecting precancerous or even cancerous lesions is a positive and desirable one, but patients' reluctance sometimes speaks for itself. Fear of bad news, or a serious diagnosis, prevents many people from choosing to perform these tests.

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