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Editorial

Clinical Dentistry and Oral Cancer Screening

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Editorial

The In accordance with the Center for Disease Control and Prevention (CDC) and the World Health Organization (WHO), from September 2019, the American Dental Association (ADA) now recommends dentists to routinely conduct oral and oropharyngeal cancer screening on all patients. [1-4]

Despite technological advancements in diagnosis and treatment, oral cancer ranks as the sixth most common malignancy worldwide and still presents one of the lowest five-year survival rates (<60%) among the major types of cancer, with only marginal improvements in the last five decades. [1-4]

Since the majority of the patients are identified at the later stages, a pivotal role of the general dentists is to early identify the precancerous and cancerous lesions and follow a correct decision making to avoid unnecessary delays. [2,5]

Visible changes in the oral mucosa in the form of leukoplakia, erythroplakia or fibrosis, usually precede the cancer development, and the area is readily accessible to direct visual and tactile examination. However, data from the NCI shows that only a fraction (~20%) of Americans receive it. [4] Moreover, general dental practitioners lack the experience to differentiate between potentially malignant lesions and confounding ones [5]. Dentists often encounter benign red and white patches during routine patient screenings, and remit them for biopsies, which cause both unnecessary psychological strain and delay. [5]

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These findings led to the introduction of various new technologies, based on the non-invasive tissue autofluorescence phenomenon [5-11]. Various endogenous proteins of the oral epithelium and its underlaying connective tissue readily absorb UV and visible light, and partially re-emit it at a longer wavelength in the form of fluorescence. [5,12] In carcinogenesis, the tissue optical characteristics change. Metabolic and structural alterations, predominantly within its stromal collagen, lead to a decrease with its natural reflectance and to reduced visual fluorescence. [9]

Some of the commercially available products include Reveal® (Designs for Vision Inc, USA), Identafi® (DentalEZ, USA) and VELscope® (LED Dental, Inc ,Canada). While the devices make use of different wavelengths, the main difference among them lies with the operational freedom of the operator. Among the three, the Reveal® system is the only one integrated into a magnification loupes, thus leaving the operator two free hands. The added benefit allows the operator to perform additional procedures as calculus and biofilm detection and fluorescence assisted caries removal. [13-17].

While these devices aim to alert the general practitioner from potentially malignant lesions, high percentages of false-positive call for a polymodal approach, using a fluorescent agent. [5, 17-20] 5-ALA (Aminolevulinic acid) is one of the three approved agents for intraoperative fluorescence in clinical use, and the only FDA-approved fluorescence agent in neurosurgery [20]. In addition, it has a proven effectiveness of over three decades in visualizing superficial tumor cells and destroying them upon blue light excitation [21]. 5-ALA does not fluoresce by itself, but is metabolized into protoporphyrin IX (PpIX), which is a highly fluorescent compound. Metabolic alterations taking place within the cancerous cells inhibit PpIX metabolism and cause it to accumulate, making it an efficient cancer-marker [21-22].

In conclusion, the clinician can improve the efficiency of the oral cancer screening process by using a combination of autofluorescence examination followed by PpIX fluorescence test. [19] This may reduce the rate of unnecessary biopsies and the related psychological strain that accompanies them. [5] It is important to highlight that a biopsy of the suspected lesion is the only diagnostic and definite tool for oral cancer [2,5], while the other methods serve to enhance screening. A biopsy is strongly advised along with referral to a specialist for any lesion persisting more than 2 weeks, without a suspected irritant. [23]

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