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Position Paper

American Association of Oral and Maxillofacial Surgeons

Oral Lesion Evaluation, Biopsy Techniques and Referral Criteria for General Practitioners

Background

The head and neck region is composed of numerous anatomic structures made of diverse soft and hard tissues that can give rise to a broad spectrum of head and neck lesions and pathologies. The intent of this position paper is to provide a broad overview in the initial evaluation and diagnosis of oral, head and neck lesions.

Entities of the oral cavity can generally be broken down into categories based on their tissue of origin. Tissues in the oral cavity include mucosa, submucosal tissues (such as minor and major salivary glands, nerves, muscles, vessels, adipose tissue), bone, teeth and periodontal structures. Table 1 – although not meant to be all-inclusive – includes some of the more common oral lesions and their tissue of origin.

Risk Factors

Risk factors vary for the different entities. For squamous cell carcinoma and dysplasia, major risk factors for the oral cavity and oropharynx include smoking tobacco, alcohol consumption, the synergistic interaction of tobacco use and alcohol consumption, and tobacco and betel quid ("paan") chewing (Table 2).[1-4] Natural or artificial sunlight exposure over long periods of time is a major risk factor for lip and skin cancers.[5]

Evidence has shown human papillomavirus (HPV) infection to be a risk factor for oropharyngeal carcinomas, with 80 percent of those being caused by HPV. The role of HPV infections in oral cavity cancer is negligible; this is an important distinction to understand so as not to cause confusion among patients and the public. The oropharynx lies directly behind and is contiguous with the oral cavity and consists of the soft palate, base of tongue, tonsils, and lateral and posterior pharyngeal walls.

Individuals with rare inheritable diseases and other disorders such as Fanconi anemia, Li-Fraumeni syndrome, dyskeratosis congenita, Bloom Syndrome, Plummer-Vinson syndrome and acquired immunodeficiency are also at increased risk for developing head and neck cancer.[1,3,4,6]

Role of the Oral Healthcare Provider

The dental profession holds an expert status with regard to the oral cavity and head and neck region. Oral healthcare providers are able to pick up lesions earlier with subtle findings than otherwise would be possible. Thus, the dental profession plays a pivotal role in early detection. Despite all the improvements in surgery, imaging and other adjuvant therapies, early detection remains the single most important prognostic indicator in improving patient survival.

A thorough oral, head and neck exam is crucial to early detection of oral cavity malignant and premalignant lesions. This examination also may aid in the detection of other benign or malignant submucosal lesions listed in Table 1. Based on the current evidence, AAOMS recommends healthcare providers conduct a history with risk assessment of patients regularly and perform a visual and tactile exam of the head and neck and oral cavity in patients identified as having risk factors and/or signs and symptoms. For dental providers, it is a recommended that a thorough oral, head and neck exam be performed at each dental visit.[7,8]

The patient's full medical history, social history and review of systems should be taken – assessing for risk factors or signs or symptoms of oral, head and neck cancer or other oral, head and neck pathologies. A list of signs and symptoms and exam findings that may be deemed worrisome on history and exam are listed in Table 3.

The exam requires adequate lighting, a dental mouth mirror or tongue depressor, 2 x 2 gauze and gloves. With the patient seated, the extraoral and perioral tissues are examined first, followed by the intraoral tissues. Inspection of the head/scalp, face, ears and neck is performed. The regional lymph node areas of the head

and neck are palpated bilaterally evaluating for cervical lymphadenopathy and also evaluating for thyroid enlargement and masses. The preauricular regions should be palpated for parotid lesions. The perioral exam should inspect the face and lips. Intraoral exam should include visual inspection of every mucosal surface within the oral cavity in a systematic manner, including the labial mucosa and vestibules; commissures, buccal mucosa and sulcus, buccal and lingual gingiva, alveolar ridge, tongue, floor of the mouth and hard and soft palate (Figure 1). Bimanual palpation of the floor of mouth also should be performed, along with palpation of the sublingual and submandibular glands.[9]

Any suspicious lesions – including red, white, mixed red/white lesions or masses – that do not resolve within two weeks should be cosidered for a biopsy for definitive diagnosis and to rule out premalignant or malignant lesions (Figures 2 and 3). Similarly, masses, chronic ulceration and new or enlarging pigmented lesions should be considered for biopsy.[10,11]

A brief overview of biopsy techniques available to the general provider follows:

Incisional Biopsy

Incisional biopsy provides a representative sample of tissue for diagnostic purposes. It is the method of choice when the differential diagnosis includes malignancy as to allow for proper post-biopsy treatment by the treating surgeon. The biopsy site selection should be at the most representative site of the lesion while avoiding areas of ulceration and gross necrosis, as those may yield non-diagnostic tissue. A sample of the most representative tissue is sufficient without the need to include tissue from the periphery. Elliptical biopsy design facilitates primary closure when healthy tissue remains.

Excisional Biopsy

Excisional biopsy is the complete removal of a lesion to provide a definitive histological diagnosis. This procedure is appropriate only when the lesion is most certainly benign with no suspicion of malignancy as in the case of an irritation fibroma.[12]

Punch Biopsy

Punch biopsy may be used for either incisional biopsy or excision of a small lesion. The main advantage of punch biopsies is they allow the harvesting of a core of tissue with preserved tissue architecture. The punch device is placed on the lesion with a downward, twisting motion to produce a tissue core that can be amputated at its base and submitted for histopathologic evaluation.[13]

Biopsy Considerations

For sites involving the attached gingiva and hard palate, biopsies make primary closure difficult and healing is generally completed by secondary intention. Hemostasis in such open wounds may be achieved by placing a scaffolding such as absorbable collagen and/or the use of chemical cautery such as silver nitrate.

When handling the specimen, it must be gently grasped with forceps to prevent crushing of the specimen or shearing of the mucosal layer. Specimens should be clearly labeled, and care must taken to avoid mixing of specimens when biopsying multiple sites.

Specimens are submitted in 10% neutral buffered formalin solution to allow for proper fixation. Specimens requiring immunofluorescence studies require a water-based solution such as Michel's solution.

Pertinent medical history, clinical history and relevant radiographic imaging should be included with the specimen and are helpful to the pathologist in rendering a correct diagnosis.

Some lesions may be contraindicated for biopsy or may require additional expertise. Examples of those include vascular lesions; lesions with red, purple or blue coloration; or pulsatile lesions. When biopsying the floor of the mouth, care must be taken to avoid damage to adjacent anatomic structures – including the submandibular duct, lingual nerve and sublingual glands. Patients with complex medical issues, with bleeding disorders or on anticoagulants may be best managed by an oral and maxillofacial surgeon.

For cancerous lesions, providers are encouraged to familiarize themselves with head and neck fellowship-trained oral and maxillofacial surgeons in their area. Such training allows for the optimal treatment of cancer patients while taking into account the dentition, occlusion and the temporomandibular joints – all of which are vital for providing superior reconstructive outcomes.

Role of Screening Adjuncts

There are numerous screening adjuncts on the market that are aimed to help diagnosing dysplastic mucosal disease. A detailed discussion of each of these modalities is beyond the scope of this position paper, but these modalities include vital stains such toluidine blue and Lugol's iodine. Adjuncts also include tissue fluorescence imaging such as VELscope and other systems that use a blue light with wavelengths in the range of 390 – 460 nm to differentiate the fluorescence between normal and abnormal tissues. Chemiluminescence, such as ViziLite, utilizes a blue-white light in the range of 490 – 510 nm following preparation of the oral mucosal tissues with 1% acetic acid (and may use manufacturer-specific eyewear). Brush biopsies attempt to obtain cytologic tissue without the need for scalpel biopsies but have sensitivities and specificities varying between 71 – 100% and 27 – 100%, respectively.

Although these screening adjuncts may be helpful in encouraging providers and patients to conduct a thorough oral exam, current evidence does not demonstrate any advantage of these screening adjuncts over a comprehensive clinical oral exam. Such positions have been summarized in different position papers, including the Head and Neck Cancer Screening and Prevention Position Paper by the American Association of Oral and Maxillofacial Surgeons, the Position Statement on Early Detection of Pre-Malignant Oral Cancer by the American Head and Neck Society (AHNS), and Evidence-based Clinical Practice Guideline for the Evaluation of Potentially Malignant Disorders in the Oral Cavity report by the American Dental Association.[7,14]

The position of the current body of evidence is consistent in that there is no substitute for a comprehensive oral head and neck exam; however, if screening adjuncts help or motivate dental providers to examine patients, then they may be utilized.

Table 1

Tissue of Origin for Oral Lesions

Epithelial / Mucosal		
• Hyperkeratosis • Papilloma	Potentially premalignant: • Proliferative verrucous leukoplakia • Epithelial dysplasia (mild, moderate, severe) • Carcinoma in situ • Submucous fibrosis	Malignant: • Squamous cell carcinoma • Verrucous carcinoma • Carcinoma cuniculatum
Pigmented Mucosal		
	• Melanotic macule • Racial pigmentation • Amalgam tattoo • Nevus • Oral melanoacanthoma • Melanoma	
Mesenchymal Tumors		
Benign: • Fibroma • Lipoma • Neuroma • Schwannoma • Neurofibroma • Myofibroma • Leiomyoma • Granular cell tumor • Schwannoma • Vascular lesions including hemangiomas and arteriovenous malformation • Osteoma		Malignant: • Angiosarcoma • Kaposi sarcoma • Fibrosarcoma • Liposarcoma • Chondrosarcoma • Osteosarcoma
Salivary Gland		
Benign: • Mucocele • Ranula • Pleomorphic adenomas • Myoepithelioma • Warthin Tumor • Monomorphic adenomas • Canalicular adenoma • Basal cell adenoma		Malignant: • Mucoepidermoid carcinoma • Adenoid cystic carcinoma • Polymorphous adenocarcinoma • Carcinoma ex pleomorphic adenoma • Acinic cell carcinoma • Secretory carcinoma

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Odontogenic Tumors (2022 WHO Classification)			
Epithelial: • Adenomatoid odontogenic tumor • Squamous odontogenic tumor • Calcifying epithelial odontogenic tumor • Ameloblastoma, unicystic • Ameloblastoma, extraosseous/peripheral • Ameloblastoma, conventional • Adenoid ameloblastoma • Metastasizing ameloblastoma	Mesenchymal: • Odontogenic fibroma • Cementoblastoma • Cemento-ossifying fibroma • Odontogenic myxoma	Mixed: • Odontoma • Primordial odontogenic tumor • Ameloblastic fibroma • Dentinogenic ghost cell tumor	Malignant: • Sclerosing odontogenic carcinoma • Ameloblastic carcinoma • Clear cell odontogenic carcinoma • Ghost cell odontogenic carcinoma • Primary intraosseous carcinoma, NOS • Odontogenic carcinosarcoma • Odontogenic sarcomas

Table 2

Oral Cancer Risk Factors

Established / Strongly Suggestive	Possible / Speculative
Smoking	Immune deficiency
Chewing tobacco	Dentition
Snuff dipping	Ethnicity
Alcohol misuse	Viruses
Sunlight (lip)	Periodontal disease
	Mouthwashes
	Familial

Table 3

Worrisome Symptoms and Exam Findings

Difficulty chewing, swallowing or managing secretions	May be due to deep neck infection or a mass/tumor invading the tongue and its adjacent musculature.
Dysphagia or odynophagia	May be due to a supraglottic/hypo/oropharyngeal neoplasm.
Trismus or difficulty opening the mouth	May be due to an infection or neoplasm involving the masticator space and muscles.
Otalgia or ear pain	May be referred pain due to a head and neck malignancy.
Hoarseness	May be present in patients with laryngeal cancer.
Numbness of the lip, tongue or other areas of the mouth and/or face	May be the result of malignancy or neoplastic process involving the inferior alveolar, lingual or other sensory nerves.
Swelling of the jaws that causes dentures to fit poorly or become uncomfortable	A possible sign of expansion of the maxilla or mandible.
Leukoplakia, erythroplakia, erythroleukoplakia	May represent pre-cancerous or cancerous lesions.
Ulceration	May be due to malignancy, trauma or autoimmune disorders.
Induration	May be associated malignant disease.
Enlarged or fixed cervical lymph nodes	May represent metastatic spread/involvement.
Palatal mass or Swelling	May be a salivary gland neoplasm, lymphoma or infection.
Floor of mouth mass or Swelling	Can be a salivary gland neoplasm, ranula or other process.
Uvular deviation and pharyngeal swelling	Can see with deep lobe parotid tumors or oropharyngeal tumors.
Displaced, loose or floating teeth	Can be the result of a destructive lesion of the maxilla or mandible.
Spontaneous bleeding around teeth, with loose teeth, jaw expansion, and a palpable pulsation or thrill	Can be seen with arteriovenous malformation.
Facial asymmetry	May be the result of a neoplasm in the soft tissues or expansion of the maxilla or mandible from a neoplasm.
Facial nerve weakness	Can indicate a malignancy of the parotid.
Pigmented lesion	Needs to be evaluated to rule out oral melanoma.

Figure 1

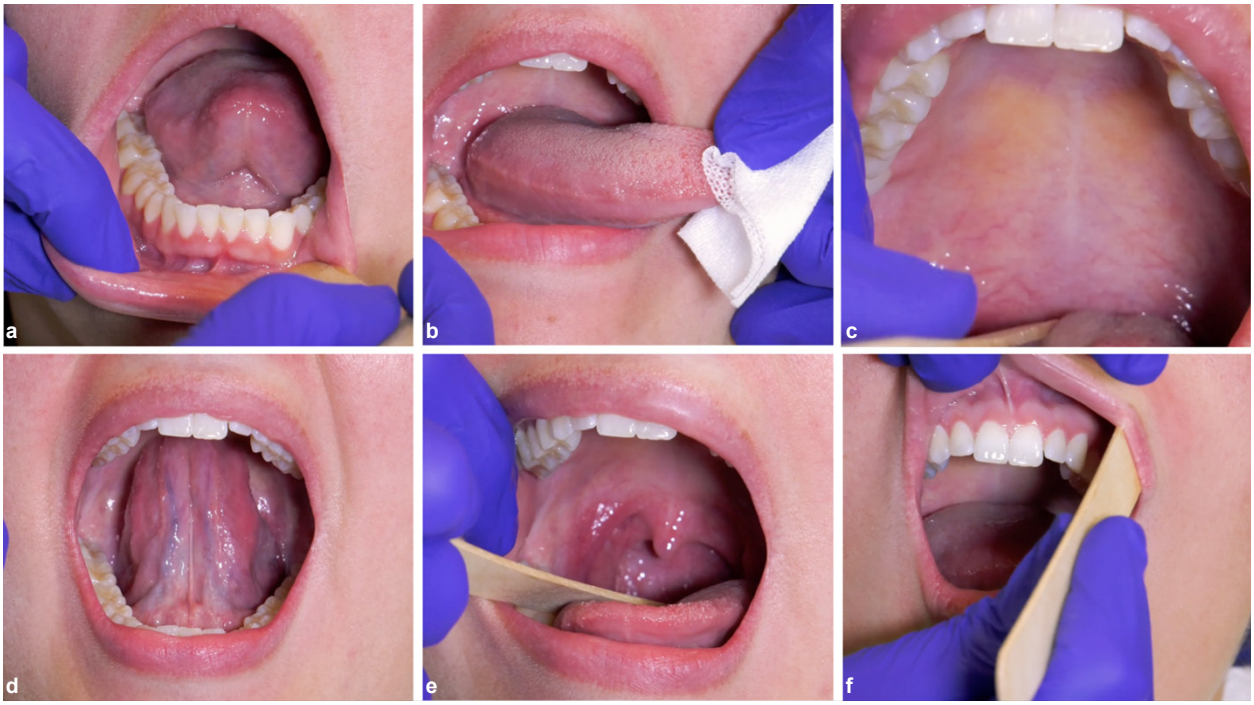

Figure 1: Examination of a) labial mucosa, lips, buccal gingiva and vestibule; b) lateral border of tongue; c) hard and soft palate; d) ventral tongue and floor of mouth; e) oropharynx and f) maxillary buccal gingiva and vestibule.

Figure 2

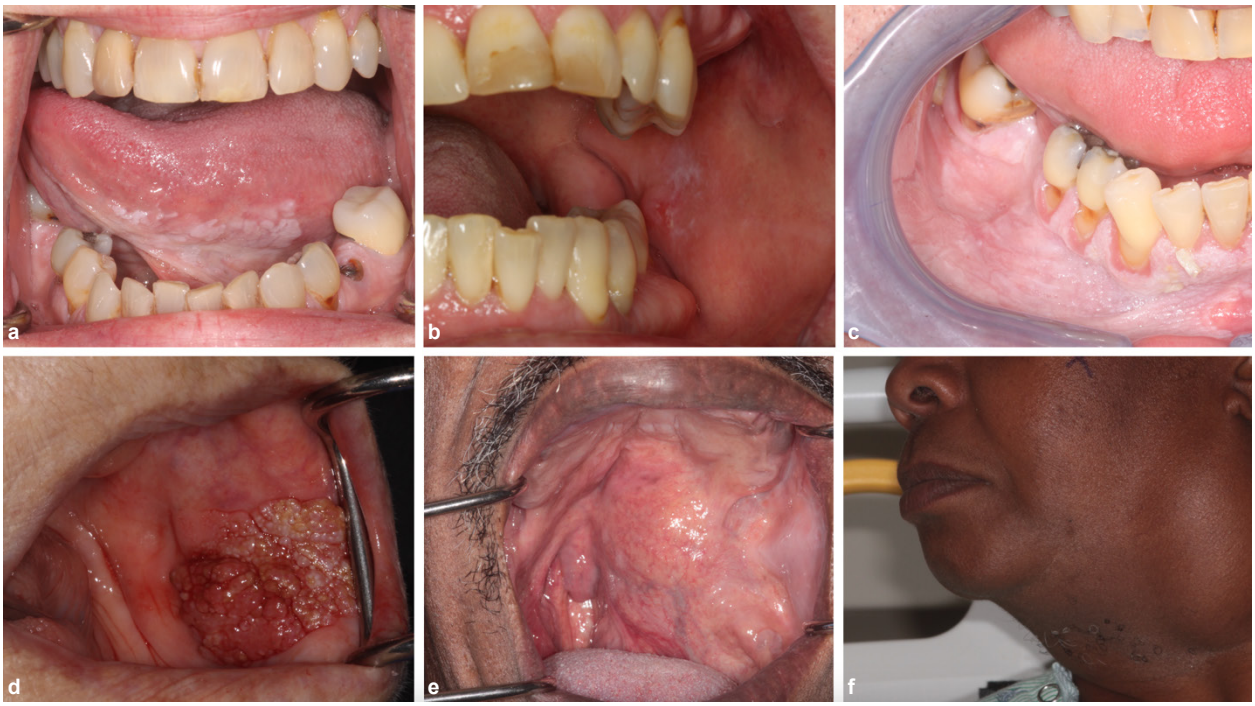

Figure 2: Examples of oral lesions include a) leukoplakia involving the ventral tongue, dysplasia; b) mixed red/white lesion involving the left buccal mucosa, dysplasia; c) leukoplakia involving the right mandibular vestibule and gingiva, tobacco pouch keratosis; d) corrugated and papillary red lesion involving the left buccal mucosa, verrucous carcinoma; e) left submucosal swelling of the soft palate and oropharynx, lateral pharyngeal mass; and f) left preauricular/facial mass, parotid tail tumor.

Figure 3

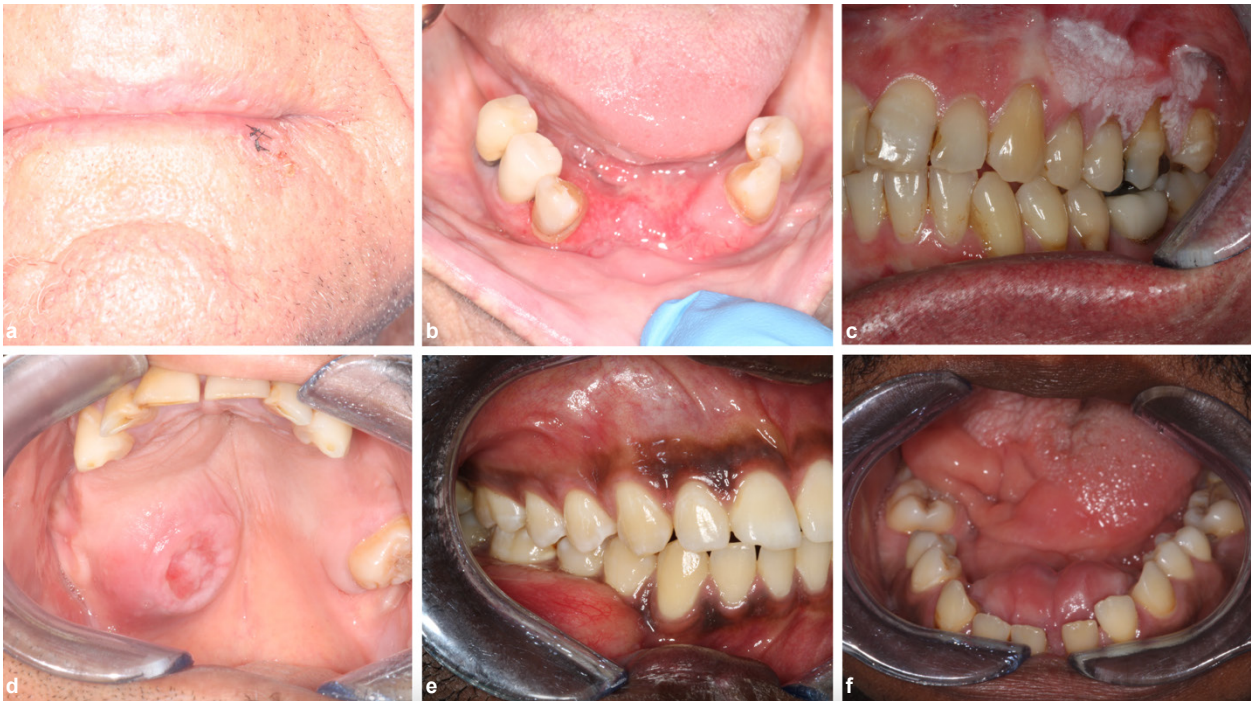

Figure 3: Examples of oral lesions include a) left lower lip scaly lesion, SCCA; b) red lesion involving the anterior mandibular gingiva, SCCA; c) corrugated leukoplakia involving the left maxillary gingiva, proliferative verrucous leukoplakia; d) right submucosal palatal mass with superficial ulceration, pleomorphic adenoma e) right mandibular vestibule firm mass, osteosarcoma; f) multiple soft-tissue growths involving the floor of mouth, ventral and lateral tongue, neurofibromas.

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