The ADA Practical Guide to Soft Tissue Oral Disease, Second Edition is a fully updated new edition of this popular guide to oral and maxillofacial diseases likely to be encountered in general or specialist dental practices. Emphasizing foundational information on the most common oral diseases, the book provides summaries of essential information for diagnosing and treating soft tissue oral pathology. With a focus on clinical decision-making, the book includes important information for diagnosing disease and determining the best course of action.

In addition to updates to knowledge, references, and images throughout, the Second Edition covers new diagnostic methods, narrowband imaging devices, and saliva sample testing. It offers self-testing clinicopathologic exercises for readers to practice their skills and gain confidence, and includes review questions at the end of each chapter so they can test their knowledge.

- Easy-to-use, updated resource with brief synopses for everyday clinical reference
- Includes self-testing clinicopathologic exercises to help readers further their skills and gain confidence in their knowledge
- Focuses on decision-making, from communicating diagnoses to developing and discussing treatment plans
- Presents clinically oriented information on the most important aspects of common oral and maxillofacial diseases
- Features detailed color illustrations, treatment algorithms, differential diagnosis, and case examples with discussion

The ADA Practical Guide to Soft Tissue Oral Disease is an invaluable reference on oral pathology for general dentists and dental specialists alike, as well as hygienists, undergraduate dental students, and postgraduate dentists in advanced training programs.

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The Extraoral and Intraoral Soft Tissue Head and Neck Screening Examination

It is paramount that the dental clinician establishes a repeatable, logical, sequentially organized, and systematic approach to screening the soft tissues of the head and neck region. It should be understood that this is not an “oral cancer screening,” since all abnormal conditions should be detected. Performing an oral cancer screening means looking for a single condition, cancer, at a single point in time; the dental clinician performs a complete exam, looking for all soft tissue abnormalities at a single point in time. There is no universally acknowledged step-by-step approach; therefore, the following is the one we adhere to and it can be modified as desired. The important point is that, whatever sequence is established, it should be strictly adhered to each time to ensure that no step is omitted. A suggested ideal sequence of steps for a complete oral mucosal screening procedure of a new patient includes the following:

- Introduction to the patient
- Patient’s chief complaint
- History of the present illness
- Medical (including social) and dental histories
- Physical examination (to detect the site, morphology, and color of abnormalities)
- Review of data and formulation of a clinical differential diagnosis
- Additional clinical and laboratory tests ordered, as indicated
- Final definitive diagnosis with a treatment/management plan formulated

Certainly, the clinician should establish a pleasant rapport with the patient so that excellent communication and trust are established. Often, the most critical or important piece of information a patient possesses does not get transmitted to
the many forms filled out at the initial dental appointment. Once the patient’s trust, confidence, and respect have been secured, the patient’s chief complaint must be established. This can be a specific dental problem or a more generic goal such as “I need a checkup exam.”

If the patient voices a specific reason for the dental appointment, it is very important to gather as much subjective information from him or her as possible. The collective sets of subjective information are the patient’s symptoms. Symptoms include descriptions such as pain, burning, dry mouth, soreness, swelling, roughness, and paresthesia. Whatever the symptom, its specific nature should be questioned, such as onset, duration, periodicity, nature or character, severity, and triggering factors or association. This information helps establish the history of the present illness. The clinician gathers a pocketful of diagnostic clues provided by the patient and combines them with the clinician’s pathology knowledge to guide him or her to ask appropriate and insightful follow-up questions. Thus, the clinician acts as a detective and must possess foundational knowledge of head and neck disease and pathology in order to learn more about the patient and gather more clues for the formulation of a well-honed clinical differential diagnosis. Subsequent chapters of this book provide foundational knowledge – both general and specific – of the most common soft tissue head and neck pathology.

Following determination of the history of the patient’s present illness, the medical history is reviewed with the patient. Typically, the patient has previously completed a detailed form providing the clinician with basic information about childhood diseases, vaccinations, hospitalizations and prior surgeries, any current medical care, date of the last physical examination, and medications (i.e. prescription and over-the-counter, including herbs) being taken or previously used, especially in the past 6 months. Details about the medications, including name, dosage, and duration of use, are recorded. A complete review of systems (e.g. cardiovascular, pulmonary, renal, endocrine, nervous system) is performed to gather more details than the initial “yes” or “no” responses. In addition, the medical history also includes the patient’s psychological and socioeconomic profiles as well as social habits (e.g. tobacco and alcohol abuse).

Next, the dental history, including details of any oral habits, is gathered. It is important to note decayed, missing, and restored teeth as well as any active caries; periodontal disease; history of extractions and other oral surgery procedures; tooth vitality status; and any need for patient premedication. Any previous problems during dental care are discovered and discussed. Oral habits include the patient’s technique and frequency of flossing, brushing, use of mouthrinse, and occlusal disharmonies.

**Physical Examination**

It is popular to compare the left and right side for bilateral symmetry while understanding that perfect symmetry is often not present within the range of normal. This is particularly important in order to visualize enlarged lymph nodes or parotid glands.
**Extraoral Sites**

Specific sites include the following:

- Hair and facial skin
- External eyes
- External ears
- Temporomandibular joints
- Facial muscles
- Nasal vestibule
- Thyroid gland (anterior neck)
- Lymph nodes (lateral and posterior neck, supraclavicular notch)
- Parotid gland

Assess the hair for thickness and loss; carefully examine the sun-exposed facial skin for ultraviolet damage and lesion development, as well as the neck, ears, forehead, nasal bridge and alae, malar region, eyebrows/eyelids/eyelashes, vermilion of the lips, and the chin. Next, perform careful palpation of each of these sites to rule out the presence of deeper, connective tissue and other types of tissue swellings.

Palpate all lymph nodes and note any enlargement for additional testing since normal lymph nodes are soft and not palpable (Fig. 1.1). Specifically, the subcutaneous tissue is digitally kneaded with a rotating motion in the areas of lymph nodes based on the clinician’s knowledge of anatomy. This process can begin in the submental area, below and lingual to the chin, against the mylohyoid muscles. Next, palpate the submandibular nodes by pressing the tissue below the jaw against the medial side of the mandible or by bimanual palpation with one finger in the mouth and the other externally pushing up. Next, palpate the parotid gland and its associated lymph nodes – look and feel anterior and posterior to the ear. Next, palpate the cervical lymph node chain. The posterior cervical chain is along the back of the neck, and the anterior and deep cervical chain is along the submandibular area.

![Figure 1.1 Cervical lymph node levels.](image-url)
the patient’s mouth wide open so that the cheek is stretched taut. Place four fingers flat on the face over the parotid gland in the preauricular area and milk the gland by using digital pressure to compress it against the masseter muscle or ramus area. Most patients exhibit a subtle white line at the occlusal plane of the buccal mucosa (i.e. linea alba), which is considered a variation of normal. While retracting the cheeks, use mirror-assisted indirect vision to examine the tuberosity/hamular notch area and then, with direct vision, use the fingers and a mirror face to retract the buccal and labial mucosa, and observe the facial alveolar mucosa, mucogingival junction, attached gingiva, and free

**Figure 1.2** (a) Oral cavity proper, frontal view. (b) Major components forming the boundaries of the oral cavity proper, sagittal view. The oral cavity (unshaded area) is divided from the oropharynx (shaded area) anteriorly/posteriorly at the posterior extent of the anterior two-thirds of the tongue; the superior/inferior extent of the oral cavity is the hard palate and floor of the mouth; the superior/inferior extent of the oropharynx is the nasopharynx and hypopharynx.
More recently, a cytobrush technique involving liquid fixative has been introduced not only in hospitals and physician offices but also in some oral pathology laboratories. In this cytology technique, a nylon bristle cytology brush developed for gynecological ectocervical and endocervical scrapings is used to obtain a full-thickness epithelium specimen from the oral or oropharyngeal mucosal surface (clinically indicated by pinpoint bleeding spots as seen with the BrushTest), but instead of the clinician then smearing the harvested cells (i.e. keratinocytes) directly onto a glass slide (frosted or clear type), the bristle end of the brush is immersed directly into an alcohol-based fixative for transport to the oral pathology laboratory (Fig. 1.7). At the laboratory, the harvested cells in the fixative and retained on the brush’s bristles are collected.
A few years after the advent of ViziLite, Zila Pharmaceuticals gained FDA clearance to market ViziLite Plus® (Fig. 1.9). With this system, following a conventional light examination and the use of the ViziLite reflectance device, an additional marking step can be performed; it is not a stand-alone step. The marker is a large cotton swab of pharmaceutical-grade tolonium chloride (toluidine blue), marketed as TBlue630 (the numerical portion of the dye’s trademark name represents the nanometer wavelength of the chemiluminescent blue-white light). Toluidine blue is a metachromatic dye with an affinity for DNA and can be used by the clinician to stain and subsequently photodocument a previously identified acetowhite lesion [12, 13]. Currently, ViziLite Plus and TBlue630 are manufactured by DenMat Holdings, LLC (Lompoc, CA).

**Narrowband Imaging (Autofluorescence)**

Late in the first decade of the 2000s, a new type of adjunctive screening device began to be marketed, predicated on the FDA 501(k) medical device clearance granted ViziLite. Current examples include the VELscope Vx® (LED Dental, Inc., White Rock, British Columbia, Canada; Fig. 1.10), Sapphire Plus® LD (DenMat Holdings, LLC), Oral ID 2.0 (Forward Science Technologies, Inc.), ViziLite PRO Oral Lesion Screening System (DenMat Holdings, LLC), Bio/Screen Oral Exam Light (AdDent, Inc.), Identafi Oral Cancer Screening System (StarDental, DentalEZ Group, Inc., Malver, PA; Fig. 1.11), and DentLight DOE™ Oral Exam System (DentLight, Inc., Richardson, TX; Fig. 1.12). Each uses the principle of tissue fluorescence as opposed to tissue reflectance [14–18].

Normal oral mucosa, both surface epithelium and the underlying lamina propria’s connective tissue, contain cellular structures – chromophores – that are
involved in normal biochemical reduction–oxidation reactions (e.g. NADH and FADH). These chemical reactions cause a pale green wavelength emission that cannot be seen with the naked eye under normal lighting conditions since it is extremely faint and overwhelmed by the absorbance, reflectance, and scattering of white light within the oral cavity. The VELscope and the similar devices just mentioned use light-emitting diodes (LEDs) to produce a narrow band of blue or violet (Identafi) wavelength light that stimulates the chromophore-related green autofluorescence. Through a series of filters either contained within the machine or worn by the clinician, all other wavelengths of white light are eliminated so that normal oral mucosal tissue appears green and an area of mucosa with loss of fluorescence indicates a loss of chromophores. The latter could indicate mucosal pathology including the presence of epithelial dysplasia. Thus, narrowband emitting lights can be used in formulating a clinical differential diagnosis of mucosal pathology that has already been examined by white light. It is very important to understand that these devices are not diagnostic but, at best, adjunctive clinical information that can be used by the knowledgeable clinician. A prerequisite for the adjunctive use of narrowband reflectance is the knowledge of oral mucosal conditions that can provide a false positive or a false negative result. Once a mucosal lesion is detected by white light and loss of fluorescence is demonstrated by one of these devices, the patient should return in 2 weeks to confirm the lesion’s persistence. If the lesion persists, then an incisional biopsy should be performed in order to provide the patient with an accurate definitive diagnosis and subsequent treatment based on that diagnosis.

**Saliva Samples**

There are several commercially tests available or in development that claim to be helpful to the clinician in deciding whether to assign a patient over the age of 18 into a low-risk or high-risk group with respect to the development of oral and oropharyngeal cancer and, although unstated, specifically squamous cell carcinoma. It is very important to understand that, as of 2017, these tests have a paucity of research study results in peer-reviewed publications that confirm their reliability and validity [19, 20].

The OraMark Test (Vigilant Biosciences, Ft. Lauderdale, FL) measures the soluble CD44 and total protein levels in an oral saliva sample with the assumption that the patients with squamous cell carcinoma have an increased level of soluble CD44 and total salivary protein. As of May 2017 the company had begun clinical studies in the hopes of obtaining FDA clearance. The most pertinent patient study population is those at higher risk. Confounding variables with respect to the test’s specificity and sensitivity include periodontal patients having elevated salivary CD44 and elevated crevicular and salivary protein levels, cigarette smokers having elevated CD44 levels, and the expression of CD44 by not all oral squamous cell carcinomas [21, 22].

The SaliMark OSCC salivary DNA test (PeriRx LLC, Broomall, PA) became commercially available in late 2015. It is purported to be an oral cancer risk stratification text recommended for use by the clinician when suspicious lesions are observed and additional testing is warranted. Six salivary mRNA biomarkers (i.e. ILIB, IL8, OAZI, SAT, S100P, and SUSP1) were validated in a multiple large
been proven to be a cause–effect relationship for oral cavity squamous cell carcinoma, which includes the known high-risk sites of lateral and ventral tongue as well as floor of the mouth. Epidemiological studies to date indicate HPV16-related squamous cell carcinomas are overwhelmingly located in the oropharynx, much of which is not visible during the course of a general dentistry examination [27, 28]. Most recently, metabolomics analysis results of saliva have been published in peer-reviewed journals [29, 30]. It is known that among the more than 100 biomarkers present that could indicate oral squamous cell carcinoma, many are also present in oral inflammatory diseases including periodontal disease. Therefore, this novel saliva testing hopes to achieve a higher specificity than current saliva analysis by studying metabolites with small molecular weights rather than the current marketed tests that rely on proteins or mRNAs.

**Conclusion**

The adjunctive oral mucosa pathology screening aids described in this chapter could possibly provide some additional information on the diagnostic and decision-making process, but they do not provide a diagnosis and are only to be performed after a routine conventional head and neck extraoral and intraoral examination has been completed. The latter examination under bright white light, with palpation, remains the highest standard in patient care.

The following chapters of this book are intended not only to aid the dentist in proper examination and documentation of detected oral and oropharyngeal (and possible facial skin) pathology but also to enhance differential diagnosis skills and aid in the decision of whether to observe, refer, or biopsy the lesion.

**Cited References**

4. Which examination technique provides a definitive diagnosis of oral squamous cell carcinoma?
   a. Transepithelial cytology
   b. Tissue reflectance
   c. HPV detection within saliva
   d. Tissue biopsy

5. The posterior wall of a patient’s oropharynx reveals scattered, smooth, yellow papules. What is the next most appropriate clinical step to perform?
   a. Tissue biopsy
   b. Reevaluation within 2 weeks
   c. Transepithelial cytology
   d. Narrowband imaging

6. What causes the pale green fluorescence of the oral mucosa during the use of narrowband imaging?
   a. Chromophores
   b. Latent HPV
   c. Squamous cell carcinoma
   d. Inflammation