Risk Assessment & Oral Diagnostics in Clinical Dentistry

Many diseases can have an impact on oral health and the safe delivery of dental care. Consequently, oral health care providers need to be comfortable with assessing the risk of providing dental care to their patients with systemic disease as well as the evaluation of oral conditions that may represent manifestations or consequences of systemic disease. Risk Assessment & Oral Diagnostics in Clinical Dentistry aims to enable the dental practitioner to comfortably and capably assess when medical conditions may impact dental care and diagnose oral conditions using routine testing modalities.

This clinical guide contains succinct and detailed text with visual aids regarding how to obtain and perform diagnostic tests, how to interpret these tests, and the implications of tests results on the management of medically complex dental patients and patients with oral conditions. Color photographs show conditions, testing equipment, and test results. An appendix highlights the ten most common oral medicine disorders encountered in dental practice.

Key Features
• Focuses solely on diagnostic modalities
• Tables for each chapter highlight succinct diagnostic testing information
• Color photos show conditions, histology slides, radiographic images, and test procedures and results
• Appendix features the Top 10 oral conditions encountered by dentists

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Risk Assessment and Oral Diagnostics in Clinical Dentistry
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For the past few decades, the United States and world populations have increased, partly because people are living longer, resulting in individuals with chronic disease living long and robust lives. Many medical conditions can have an impact upon oral health and/or the safe delivery of dental care. For example, a patient with diabetes has an increased risk of developing periodontal disease, or a patient with a history of atrial fibrillation on prophylactic anticoagulant medication may be at a greater risk of post-operative bleeding following a surgical procedure. Consequently, oral health care providers need to be comfortable with assessing the risk of providing dental care to their patients with systemic disease as well as evaluation of oral conditions that may represent manifestations or consequences of systemic disease. This clinical guide will address these two major topics. First, we will discuss guidelines for risk assessment of systemic conditions that may complicate or be complicated by dental treatment. Next, we will review guidelines for diagnosis of oral conditions to assist in the diagnosis of orofacial conditions within the scope of dental practice.

Risk assessment of systemic health is of key importance and should be addressed upon first interaction between a dental provider and patient. After obtaining a thorough medical history (chapter 1) and vital signs (chapter 2), patients should be assessed for their potential for bleeding (chapter 3), potential for infection (chapter 4), potential for poor wound healing (chapter 5) and their general ability to withstand dental treatment. Patients with signs and symptoms of suspected disease or known disease that is not well managed require referral to a medical provider for thorough evaluation prior to providing elective dental care.

In patients with known medical conditions, diagnostic testing is typically utilized to monitor disease status and response to or compliance with treatment. In the first section of this clinical guide, we will discuss the common diagnostic tests utilized in medical settings, the interpretation of abnormal test values, and the clinical implications of abnormal findings. Dental providers should have a thorough understanding of and ability to interpret the results of diagnostic tests to better communicate with medical colleagues and to understand the disease status of their patients.

The second section of this clinical guide addresses diagnosis of orofacial disease and oral manifestations of systemic disease. Following a thorough extraoral and intraoral clinical examination, hard and/or soft tissue abnormalities should be assessed through the diagnostic process, which involves determining a differential diagnosis while taking into consideration the disease process and the system/tissue/cell type(s) involved. We will review clinical signs and symptoms of common oral conditions as well as diagnostic tests and procedures that can be utilized to determine a definitive diagnosis. The definitive diagnosis is essential in developing a plan of treatment and time interval for follow-up and monitoring.

We hope this clinical guide will be a useful tool for dental students in training, dental residents, and practicing dentists throughout the span of their professional lives. It has been designed to be an easy-to-use reference with features such as clinical images, alert boxes,
and guidelines, so that the busy clinician can quickly look up information about his/her patients to assist in guiding appropriate treatment. While the majority of dental patients can be treated with minimal risk of complications, dentists must be well informed and confident to fully address the oral health care considerations of their entire practice.

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Part A

Guidelines for Risk Assessment of Systemic Conditions that may Complicate or be Complicated by Dental Treatment
1 Basics of the Health History, Physical Examination, and Clinical Investigations

1.0 INTRODUCTION

This chapter sets the foundation for this clinical guide by describing the basic principles and processes of clinical evaluation of the patient. Risk assessment first and foremost depends on obtaining a comprehensive medical history. In addition to physical examination, the clinician must determine whether any other clinical investigations are indicated prior to providing oral health care. These elements provide an essential basis for the clinical guide.

1.1 Obtaining a complete medical history

A wide variety of medical conditions and their treatments have the potential to affect oral health and may require specific considerations prior to providing dental care. In order to adequately assess a patient’s health and determine risk for developing complications, a complete medical history must be obtained and updated on a regular basis. Whether paper or electronic medical records are utilized, this information should be clear and easy to locate. Contact information for the patient’s primary care physician and any relevant medical specialists should also be recorded and accessible. Details of all telephone, email, or mail correspondences with the patient or his/her medical providers, as well as laboratory reports, should be included in the patient’s chart.

While a self-completed health history form can be useful in screening for certain medical conditions and risks, this should be used to guide, rather than replace, the medical interview. The oral health care provider and patient should be facing each other in a comfortable and relaxed manner during the interview, and translators should be used when necessary. When there are any questions or items in the medical history requiring greater detail or clarification, the patient’s primary care physician should be consulted.

1.1.1 Chief complaint

The chief complaint is the patient’s primary reason for seeking medical/dental consultation and should be recorded in his/her own words. Sometimes, a patient’s chief complaint when he/she presents to his/her oral health care provider will be some type of oral pain or a
complication of a recent dental procedure. In some cases, the chief complaint may be directly related to an underlying medical condition. Examples include a patient with salivary gland hypofunction and rampant dental caries, or a patient with acute leukemia and acute onset of gingival bleeding.

1.1.2 History of present illness

The history of present illness relates directly to the chief complaint and is told from the perspective of the patient. This is essentially the story describing the chief complaint and should be collected in sufficient detail. Basic elements should include, as relevant to the nature of the chief complaint: history of onset; the duration, nature, quality, and timing of symptoms; complications; pain score; modifying factors; any treatment provided; and whether symptoms are stable, improving, or deteriorating.

1.1.3 Past medical history

The past medical history includes all relevant aspects of a patient’s health history both past and present. Medical conditions for which a patient has received treatment, or is actively being treated, and overall continuity of medical care should be included. Pertinent details of treatment and overall management should be obtained, such as timing of chemotherapy cycles in a patient undergoing cancer therapy, hemodialysis schedule in a patient with renal failure, or glycated hemoglobin (HbA1c) levels in a diabetic patient.

1.1.4 Medications and allergies

All current medications, prescription and non-prescription (over-the-counter, herbal supplements), taken on a regular basis must be listed. The dose, schedule, and most recent dose taken should also be noted, in particular if the medication is immunosuppressive/immunomodulatory, antihypertensive, antiglycemic, antithrombotic, or anticoagulatory. Previous exposure to specific medications, such as antiresorptive agents (e.g., bisphosphonates), is also important and should be selectively collected. If there appear to be any inconsistencies between the patient’s medical history and the list of medications, clarification should be requested. All reported drug allergies must be clearly noted, including the specific allergic reaction. Expected adverse side effects, such as gastrointestinal upset with opioid analgesics, should not be misclassified as an “allergy,” even if reported as such by the patient (adverse drug reactions).

Certain medications have the potential to interact with one another through competitive binding, or through induction or inhibition of the hepatic cytochrome p450 pathway. Some common examples, such as antibiotics, antifungals, and analgesics, are shown in Table 1.1.

1.1.5 Review of systems

The review of systems is an extension of the past medical history that serves more or less as a “checklist” of a patient’s overall health by assessing specific symptoms within each system in a comprehensive manner. Systems include neurologic/psychiatric; ears, eyes, nose, and throat (EENT); cardiovascular/respiratory; musculoskeletal; hematologic; endocrine; gastrointestinal; and genitourinary (Table 1.2). Any positive responses should be followed with additional questioning and the patient should be referred to his/her primary care physician for further evaluation when indicated.
### Table 1.1 Cytochrome P450-associated drug interactions.

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Substrates</th>
<th>Inhibitors</th>
<th>Inducers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metabolism CYP450 dependent</td>
<td>May potentiate activity of CYP450 substrates by decreasing metabolism</td>
<td>May reduce efficacy of CYP450 substrates by increasing metabolism</td>
</tr>
</tbody>
</table>

#### Class of Medication

<table>
<thead>
<tr>
<th>Substrates</th>
<th>Inhibitors</th>
<th>Inducers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antiasthmatics</strong></td>
<td>Theophylline</td>
<td></td>
</tr>
<tr>
<td><strong>Antibiotics</strong></td>
<td>Clarithromycin, erythromycin</td>
<td>Ciprofloxacin, clarithromycin, erythromycin, ofloxacin, metronidazole</td>
</tr>
<tr>
<td><strong>Anticoagulants</strong></td>
<td>Warfarin</td>
<td></td>
</tr>
<tr>
<td><strong>Anticonvulsants</strong></td>
<td>Phenytoin, carbamazepine</td>
<td></td>
</tr>
<tr>
<td><strong>Antidepressants</strong></td>
<td>Amitriptyline, desipramine, imipramine, paroxetine</td>
<td>Fluoxetine, fluvoxamine, paroxetine, sertraline</td>
</tr>
<tr>
<td><strong>Antifungals</strong></td>
<td></td>
<td>Clotrimazole, fluconazole, itraconazole, ketoconazole</td>
</tr>
<tr>
<td><strong>Antipsychotics</strong></td>
<td>Haloperidol, pimozide, risperidone</td>
<td></td>
</tr>
<tr>
<td><strong>Barbiturates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Benzodiazepines</strong></td>
<td>Alprazolam, diazepam, midazolam, triazolam</td>
<td></td>
</tr>
<tr>
<td><strong>Cardiac medications</strong></td>
<td>Amlodipine, diltiazem, felodipine, verapamil, metoprolol, propranolol, timolol</td>
<td>Diltiazem, verapamil</td>
</tr>
<tr>
<td><strong>Corticosteroids</strong></td>
<td>Hydrocortisone, methylprednisolone</td>
<td></td>
</tr>
<tr>
<td><strong>Food</strong></td>
<td></td>
<td>Grapefruit juice, Seville oranges</td>
</tr>
<tr>
<td><strong>H2 receptor blockers</strong></td>
<td></td>
<td>Cimetidine</td>
</tr>
<tr>
<td><strong>Herbal medications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HIV medications</strong></td>
<td>Idinavir, nelfinavir, ritonavir, saquinavir</td>
<td>Idinavir, nelfinivir, ritonavir, saquinavir</td>
</tr>
<tr>
<td><strong>Hormones</strong></td>
<td>Estrogens, progestins</td>
<td></td>
</tr>
<tr>
<td><strong>Hypoglycemic agents</strong></td>
<td>Glipizide, glyburide, tolbutamide</td>
<td></td>
</tr>
<tr>
<td><strong>Immunosuppressive agents</strong></td>
<td>Cyclosporine, tacrolimus</td>
<td></td>
</tr>
<tr>
<td><strong>Narcotic analgesics</strong></td>
<td>Codeine, hydrocodone, tramadol</td>
<td></td>
</tr>
<tr>
<td><strong>Non-narcotic analgesics</strong></td>
<td>Acetaminophen, diclofenac, ibuprofen, naproxen</td>
<td></td>
</tr>
<tr>
<td><strong>Statins</strong></td>
<td>Atorvastatin, lovastatin, simvastatin</td>
<td></td>
</tr>
</tbody>
</table>
1.1.6 Family and social history

The family history should include any significant known medical conditions in first-degree relatives or that have been present in multiple generations. The social history should include whether the patient is single, previously married and/or divorced, or in a long-term relationship, and if s/he has children, as well as any other pertinent details that might impact...
his/her overall health. In addition, the patient’s occupation is important. For those who are not working, it is important to understand why, as this may be related to an underlying medical condition. Tobacco history should be obtained in pack-years (packs per day times the number of years), and if the patient has discontinued use, for how long; regular use of marijuana should also be ascertained. Alcohol and recreational drug use history should include amount and frequency and whether there is any history of treatment for abuse, addiction, or dependency. These aspects of the social history are important as stress, lifestyle, and psychosocial factors may contribute to disease presentation and may impact management.

1.1.7 Past dental history

A patient’s past dental history provides a great deal of information with respect to future risk of developing dental disease and associated complications. This should include whether care has been routine and preventive, or sporadic and problem-driven, and if so, why. Oral hygiene practices, home care, and diet should be reviewed.

1.2 Physical examination

Vital signs, including at minimum blood pressure and pulse, should be collected on all new patients and on an annual basis for general health screening, with appropriate referral when findings are abnormal (see chapter 2). For oral health care providers, the physical examination is largely limited to the head and neck and the oral cavity, intraorally extending from the labial mucosa anteriorly, to the soft palate, tonsils, and visible oropharynx posteriorly. Limited dermatologic examination, for example, can often be informative, especially when there is a chief complaint of oral lesions and concurrent skin lesions. Similarly, a limited neurologic examination may be warranted in a patient with signs and symptoms suggestive of a central nervous system disorder (Figure 1.1; see Figure 9.2). For proper conduct of a comprehensive examination, nothing more is needed than a good light source, a mouth mirror and gauze, which can be useful for manipulating the tongue and assessing salivary gland function. Normal findings should be summarized and for all positive findings, the size must be recorded as well as a description of color, consistency and contours of tissues.

1.2.1 Extraoral examination

Extraoral examination begins with careful visual inspection for skin changes and any head/neck asymmetry or swelling (Figure 1.2). The head and neck is then palpated for swelling, tenderness, lymphadenopathy, thyromegaly, and any other abnormalities. Temporomandibular joint examination includes observation of opening, closing, and lateral excursions of the jaw, palpation of the muscles of mastication, and evaluation of the joints for sounds and tenderness (see chapter 12). Depending on the chief complaint and history of present illness, a limited or more extensive cranial nerve examination may be included to evaluate for neuromuscular and neurosensory deficits.

1.2.2 Intraoral examination

The intraoral soft tissues should be examined thoroughly, including the upper and lower labial mucosa, right and left buccal mucosa, vestibules, gingiva, ventrolateral and dorsal surfaces of the tongue, floor of mouth, hard and soft palate, and the tonsils and oropharynx.
Normally keratinized sites include the gingiva, hard palate, and tongue dorsum; these sites have a thicker, paler appearance than the rest of the non-keratinized mucosa that tends to be more pink or red in color. The mucosa should be assessed for red and/or white changes, pigmentation, ulceration, or any other abnormalities (Figure 1.3). These tissues should then be palpated for any subtle inconsistencies or masses. The major salivary glands should be bimanually palpated, and then saliva should be expressed from the glands to assess duct patency and flow, and saliva should be evaluated for amount, consistency, color, and floor of mouth pooling (Figure 1.4). Saliva is expressed and observed by drying the duct orifice and then palpating the gland distally to proximally until saliva flows from the orifice. The dentition and periodontium should be examined, and any removable prostheses

Figure 1.1 62-year-old male with metastatic prostate cancer involving the clivus (affecting cranial nerves IX and XII on the right side) with progressive right-sided tongue and constrictor muscle weakness. Straight protrusion of the tongue (a) demonstrates right-sided muscle flaccidity, whereas excursion to the right side (b) demonstrates minimal movement.
inspected for fit and function. The oropharyngeal anatomy, and in particular the tonsils, should be assessed for symmetry, size, color, and the presence of exudates or other abnormalities that might prompt referral to an otolaryngologist for further evaluation (Figure 1.5).

1.3 Ordering and performing laboratory tests

Laboratory investigations may be necessary to determine a diagnosis or to evaluate for risk prior to dental treatment. How to order laboratory tests and, importantly, what test to order, when, why, and how to interpret the results are critical to the understanding of laboratory medical procedures. Retesting to confirm abnormal findings should always be considered, in particular when the findings are unexpected.
Figure 1.3  Well-defined area of leukoplakia of the anterior mandibular alveolar mucosa, with a distinct white appearance, against a background of normal-appearing pink mucosa.

Figure 1.4  Clear aqueous saliva expressed by palpating the parotid gland extraorally.

Figure 1.5  Squamous cell carcinoma of the right palatine tonsil (arrow), appearing enlarged and erythematous with extensive ulceration.