Contents

Preface: Adjunctive Technologies in the Management of Head and Neck Pathology ix
Nagi M. Demian and Mark E. Wong

Epidemiologic Trends in Head and Neck Cancer and Aids in Diagnosis 123
Nadarajah Vigneswaran and Michelle D. Williams

Head and neck squamous cell carcinoma is the sixth most common cancer worldwide predominately associated with tobacco use. Changing cause and increased incidence in oropharyngeal carcinomas is associated with high-risk types of human papilloma virus and has an improved survival. Optical devices may augment visual oral examination; however, their lack of specificity still warrants tissue evaluation/biopsy. Histologic factors of oral carcinomas are critical for patient management and prognostic determination. Clinical biomarkers are still needed to improve early detection, predict malignant transformation, and optimize therapies.

Use of Porous Space Maintainers in Staged Mandibular Reconstruction 143
Allan M. Henslee, Patrick P. Spicer, Sarita R. Shah, Alexander M. Tatara, F. Kurtis Kasper, Antonios G. Mikos, and Mark E. Wong

The success of mandibular reconstructions depends not only on restoring the form and function of lost bone but also on the preservation of the overlying soft tissue layer. In this case study, 5 porous polymethylmethacrylate space maintainers fabricated via patient-specific molds were implanted initially to maintain the vitality of the overlying oral mucosa during staged mandibular reconstructions. Three of the 5 patients healed well; the other 2 patients developed dehiscences, likely due to a thin layer of soft tissue overlying the implant. The results presented provide evidence that a larger investigation of space maintainers fabricated using this method is warranted.

Pitfalls in Determining Head and Neck Surgical Margins 151
Y. Etan Weinstock, Ibrahim Alava III, and Eric J. Dierks

Accurate assessment of surgical margins in the head and neck is a challenge. Multiple factors may lead to inaccurate margin assessment such as tissue shrinkage, nonstandardized nomenclature, anatomic constraints, and complex three-dimensional specimen orientation. Excision method and standard histologic processing techniques may obscure distance measurements from the tumor front to the normal tissue edge. Arbitrary definitions of what constitutes a “close” margin do not consider the prognostic significance of resection dimensions. In this article we review some common pitfalls in determining margin status in head and neck resection specimens as well as highlight newer techniques of molecular margin assessment.

Chemotherapy for Oral and Maxillofacial Tumors: An Update 163
Ahmed Eid, Shuang Li, Rodolfo Garza, and Mark E. Wong

Surgery is the primary intervention in oral and maxillofacial tumors and under ideal circumstances is curative. There is no evidence to support the use of induction or adjuvant chemotherapy in initial therapy of early stage tumors. Locally advanced
tumors, non-resectable tumors as well as recurrence in early stage disease, need a multi-modality therapeutic approach involving chemotherapy. Palliative chemotherapy plays an important role in the treatment patients with metastatic oral and maxillofacial tumors. Chemotherapy and targeted agents plays an important role in the treatment of patients with rare oral and maxillofacial tumors such as sarcomas, lymphomas, and giant cell tumors.

**Anti-Resorptive Osteonecrosis of the Jaws: Facts Forgotten, Questions Answered, Lessons Learned**

Eric R. Carlson and Benjamin J. Schlott

Osteonecrosis of the jaws associated with bisphosphonate and other anti-resorptive medications (ARONJ) has historically been a poorly understood disease process in terms of its pathophysiology, prevention and treatment since it was originally described in 2003. In association with its original discovery 11 years ago, non-evidence based speculation of these issues have been published in the international literature and are currently being challenged. A critical analysis of cancer patients with ARONJ, for example, reveals that their osteonecrosis is nearly identical to that of cancer patients who are naive to anti-resorptive medications. In addition, osteonecrosis of the jaws is not unique to patients exposed to anti-resorptive medications, but is also seen in patients with osteomyelitis and other pathologic processes of the jaws. This article represents a review of facts forgotten, questions answered, and lessons learned in general regarding osteonecrosis of the jaws.

**Oral Surgery in Patients Undergoing Chemoradiation Therapy**

Nagi M. Demian, Jonathan W. Shum, Ivan L. Kessel, and Ahmed Eid

Oral health care in patients undergoing chemotherapy and/or radiation therapy can be complex. Care delivered by a multidisciplinary approach is timely and streamlines the allocation of resources to provide prompt care and to attain favorable outcomes. A hospital dentist, oral and maxillofacial surgeon, and a maxillofacial prosthodontist must be involved early to prevent avoidable oral complications. Prevention and thorough preparation are vital before the start of chemotherapy and radiation therapy. Oral complications must be addressed immediately and, even with the best management, can cause delays and interruption in treatment, with serious consequences for the outcome and prognosis.

**Evaluation and Staging of the Neck in Patients with Malignant Disease**

Jonathan W. Shum and Eric J. Dierks

This article presents an overview of the evaluation and staging of the neck in the context of malignant disease. The current tumor-nodes-metastasis (TNM) nodal classification is reviewed followed by a brief discussion of the common malignant processes encountered in the head and neck and their associated risk factors for cervical metastasis. Common imaging modalities, such as ultrasound, magnetic resonance imaging, computed tomography, and positron emission tomography, for the investigation of the neck are also summarized.

**Update in Radiation Therapy for Oral and Maxillofacial Tumors and Dose Mapping**

Ivan L. Kessel and Angel Blanco

Radiation therapy (RT) is an important modality in the treatment of head and neck cancers. Significant morbidity can result, however, because of exposure of normal
tissues to high doses of RT. Advances in planning and delivery, especially intensity modulated radiation therapy, can reduce the risk of these toxicities by ensuring that the tumor and draining lymph nodes are adequately treated, while the surrounding organs and tissues at risk are avoided. Image guidance during treatment delivery allows for smaller margins around the tumor to account for variations in daily setup and positioning. All these advances help to improve the quality of life of cancer survivors.

The Role of Bisphosphonates in Medical Oncology and Their Association with Jaw Bone Necrosis

Ahmed Eid and Jennifer Atlas

Bisphosphonates, synthetic analogues to inorganic pyrophosphates found in the bone matrix, inhibit bone resorption. Bisphosphonates and their related effects on the jaw have been established since 2001. The pathogenesis of bisphosphonate-related osteonecrosis of the jaw (BRONJ) is multifactorial and still under investigation. Currently, drugs with mechanisms of action involving remodeling suppression, osteoclast depression, and decreasing angiogenesis are under investigation for causing BRONJ-like symptoms. Further studies are needed to determine the effective length of use of bisphosphonates and the efficacy of drug holidays to prevent BRONJ.

Nuclear Medicine Imaging Studies in the Diagnosis of Head and Neck Disease

Steve Chiang

Nuclear medicine studies have a role in the evaluation of drug induced osteonecrosis of the jaw (DIONJ). In this article, we discuss the current and future applications within nuclear medicine appropriate for evaluation of DIONJ. The emphasis of this article is positron emission tomography (PET) imaging, specifically, with 18F-fluorodeoxy-glucose (FDG).

Pharmacologic Modalities in the Treatment of Osteoradionecrosis of the Jaw

James Anthony McCaul

Managing osteoradionecrosis (ORN) of the facial bones is a challenge in maxillofacial head and neck surgery. Changes in understanding of ORN of the jaws has led to new studies using novel therapeutic modalities to manage this disorder. These treatment regimens may allow medical management to replace major reconstructive surgery for some patients who have already undergone chemoradiotherapy or combined modality therapy for head and neck cancer.

Magnetic Resonance Imaging (MRI) in the Diagnosis of Head and Neck Disease

Emilio P. Supsupin Jr and Nagi M. Demian

Magnetic resonance imaging (MRI) is the modality of choice to identify intracranial or perineural spread from a head and neck primary tumor. Perineural spread is a form of metastatic disease in which primary tumors spread along neural pathways. Orbital cellulitis is a sight-threatening, and potentially life-threatening condition. Urgent imaging is performed to assess the anatomic extent of disease, including postseptal, cavernous sinus, and intracranial involvement, and identify orbital abscesses that require exploration and drainage. MRI is useful in the evaluation of the brachial plexus.