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*Immunology  
and Infectious  
Diseases of the  
Mouth, Head,  
and Neck*

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Raymond F. Zambito  
Dennis J. Cleri

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# Immunology and Infectious Diseases of the Mouth, Head, and Neck

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*Dedicated to my wife, Dorothy, and our children, Dr. Mary and Dr. John,  
Paul, Christine, John, Michael, and Peter.*

R.F.Z.

*I dedicate this book to my parents, Dominick and Emma Cleri.*

D.J.C.

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# FOREWORD

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I consider it an extraordinary privilege to write a foreword to this excellent textbook, especially since the book addresses topics I have considered ignored for too long. Our knowledge of infectious diseases and host responses to microbial challenges increased logarithmically in the past few decades. The means to control potentially harmful agents that intrude into the intimate human biosphere grew just as considerably, almost to the point where we considered infectious disease conquered. But the physiologic ingenuity of the microbial world taught us the error of such assumptions. The ability of microorganisms and viruses to circumvent the various therapies, themselves largely derived from microbial sources, by a seemingly endless array of biologic mechanisms provides us still today with a great number of challenges that underline dramatically the need for further study and exploration.

Many new textbooks of infectious disease and microbiology have appeared recently. All are characterized by an almost complete disregard of dentistry, despite the considerable understanding that has been gained by studies of microbial adherence, colonization, and consortium formation and the role of microbial exopolysaccharides in the oral cavity and its structures. It is almost a given that the mouth, teeth, tongue, and oropharynx harbor the greatest variety of microbial forms in the human body. Nevertheless, we can domesticate and identify only a fraction of these microbial residents. Depending on the individual host's immunity, any member of this vast collection of microorganisms represents a challenge to the health of each host, not only by causing disease in the oral cavity and its supporting and vicinal structures but also because this area serves as the portal of entry for all sorts of microbiota to the gastrointestinal and respiratory tracts. In addition, those who work in this area, with all the newest devices and their at-

tending aerosols, may be exposed unwittingly to the patient's microorganisms. The oral cavity and the oropharynx thus occupy a pivotal position that deserves much greater attention and appreciation.

The guiding principle in evaluating infection was enunciated by Robert Koch more than a century ago. The concepts of pathogenicity and virulence as solely microbial attributes has served us well. But today we must appreciate that microorganisms, until recently considered harmless commensals or unknown in the intimate human biosphere, are involved in human disease and complicate the recovery of many patients with an array of underlying disorders, very often as a consequence of therapeutic intervention. Pathogenicity thus becomes a meaningless term unless we also recognize the particular host at risk. Immunology is the important adjunct that often provides the answer.

The editors of this text, Drs. R. F. Zambito and D. J. Cleri, deserve our applause and gratitude in addressing the role of infection and immunity in dental practice. This tome fills an important void in making dentists and their associates aware of the microbial and immunologic challenges to patients and to themselves. This book should serve as well to acquaint physicians and microbiologists with infectious problems associated with disease in the realm of dentistry and consequently patient care. I congratulate the editors and authors for a superb effort that deserves success and acclaim.

Henry D. Isenberg, Ph.D.  
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# FOREWORD

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This text deals with a topic of enormous importance and relevance to all practitioners treating diseases of the oral cavity and of the head and neck regions. A single source containing similar material relating to infections and their management has not been available before this well-conceived work. Although adequate textbooks have defined the nature, progress, and ultimately the treatment of infectious diseases, this particular work offers a rationale as well as a clinically relevant data base, including presentation and management strategies.

The approach to infections in the orofacial region must be cautious by virtue of the wide scope of indigenous microbial forms and their interrelationship to an anatomically complex region. Woven into the wide array of microbial forms and complex anatomy is potentially serious infections and early mortality due to unchecked or poorly managed infectious processes. The task facing the clinician can often be daunting in this regard, with an acutely ill patient demonstrating an infection that may have arisen from a multitude of local events or processes, from something as common as dental caries or periodontal disease to rarities such as presentation or complications of sexually transmitted diseases.

The authors and contributors have met the challenges presented to the clinician extremely well. The building of a sound biologic and immunologic basis supports the microbial and physiologic interrelationships. Sorting the array of possible clinical presentations by formulating a differential diagnosis enables the clinician to formulate a rational and effective treatment strategy that will be essential to the well-being of our patients. These are all very well done in this publication. Our

patients will directly benefit by the material presented within this unique work, as will health professionals dealing with the diseases of the oral and head and neck regions. The editors and contributors are to be commended.

James J. Sciubba, D.M.D., Ph.D.  
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# PREFACE

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Since 1985 the general practice dental residents at our medical center have been making a 1-month off-service rotation in Infectious Diseases. The response of the residents has been uniformly good in that all residents over the 5 years have evaluated the rotation "excellent." Their improved knowledge of physiology, general medicine, and application of antibiotics has been elevated to new levels of understanding and application.

With this background of experience, it was a short step to realizing that a suitable text on the subject, covering the head and neck, was needed because no such texts were available for review or consultation. Getting such a text to reality was another story.

Once the idea was conceived, a potential table of contents developed, and a partial list of contributors drawn up, the next step was to find a publisher interested in such a project. The PSG Publishing Company of Littleton, Massachusetts, showed interest in the text, a contract was signed, and off to work we went! Dividing the labor was a separate decision requiring careful distinctions about knowledge bases and the ability to review and edit the material for a diverse audience. The job fell to the two co-editors, and a job it was! During all of the time required for the editing, much was learned on both sides and many ideas took shape that ultimately improved the outcome.

The focus of the text is the clinician who treats infectious diseases of the head and neck and oral cavity, including dentists, otolaryngologists, ophthalmologists, head and neck surgeons, oral and maxillofacial surgeons, and infectious disease experts. A concentration of information and recommendations for therapy is available to a wide variety of clinicians with diverse and overlapping responsibilities. We believe the result is an excellent treatise on the subject of immunology and infec-

tious diseases for each of the varied specialists as well as the general practitioners. Certainly other areas of medicine, for example, pediatrics and family medicine, can gain from the material in this text.

The subsequent blending of PSG Publishing Company with Year Book Medical Publishers, and the consolidation of The C.V. Mosby Company and Year Book by the parent company, Times Mirror, opened the way to marketing potential to reach every clinician who deals with head and neck diseases.

We are grateful to the many talented and gifted clinicians who contributed to making this idea a reality and for the patience of these individuals over the many months of editing and revision.

*Raymond F. Zambito, D.D.S., Ed.D.*

*Dennis J. Cleri, M.D., F.A.C.P.*

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Raymond F. Zambito, D.D.S., Ed.D.  
Dennis J. Cleri, M.D., F.A.C.P.

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# The Human Immune System

*edited by* Dennis J. Cleri, M.D.

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The human immune system must be considered as everything that protects us from our outside environment. Our skin, the complexities of the lining of the entire gastrointestinal track, and exposed mucosal surfaces, such as the conjunctivae and oral cavity, all must survive in a hostile physical environment that threatens to overheat or overcool, desiccate or macerate, and traumatize on contact. In addition, we deal with a biosphere of submicroscopic, microscopic, and macroscopic organisms that evolved simply, successfully, and before the coming of humans. Physical characteristics of secretions, such as low pH in the stomach, lactic acid and fatty acid secretions of sebaceous glands, and the physical characteristics of mucous secretions inhibit growth of microorganisms.<sup>1</sup> Mechanical mechanisms, such as bowel motility, activity of the cilia in the respiratory tract, and even the presence of normal bacterial flora, help protect humans from potential pathogens. In health, the human immune system maintains this homeostasis efficiently, recognizing self from invaders, and in most cases, uses local mechanisms of protection, both passive (preexisting circulating immune globulins) and active. When these local mechanisms are overwhelmed, infection or infestation ensues. Disease, the combination of the pathogenic effects of the invading organisms and the body's reaction to them, becomes apparent.

Understanding this system permits us to arrive at the most successful diagnosis and treatment available. "The task confronting the natural defense system can be capsulized in six key words: **encounter**,