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TEXTBOOK OF

# Oral and Maxillofacial Surgery

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EDITED BY

**Gustav O. Kruger**

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# Preface

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It is a privilege to update the book for this sixth edition. A comprehensive review of the material has been made in order to fulfill its purpose of aiding the predoctoral student, resident, general practitioner, oral surgeon, and other specialists to understand the principles and techniques of oral and maxillofacial surgery.

A new chapter, "Antibiotics: Their Use in Therapy and Prophylaxis," replaces the old chapter on surgical bacteriology because of the untimely death of its author. It seems that a practical chapter on antibiotics would be useful. Some of the material on special infections is included in the new chapter, with thanks to the former writer who covered this subject so well. We welcome a new author for the chapter on antibiotics—one who has demonstrated interest and capability in this and all other aspects of the speciality.

Among the revisions, the reader will find new sections dealing with sterilization and wound healing, supramucosal vital root retention, root cone implants, hydroxylapatite alveolar ridge augmentation, ramus frame (endosseous) implant, particulate marrow autogenous bone grafts in maxillary clefts, ceramic implants, proplast improvements,

alveolar bone grafts, temporomandibular joint arthroplasty, meniscus surgery, intraoral subcondylar oblique osteotomy, correction of maxillary lateral deficiency, rapid palatal expansion, vertical maxillary excess and deficiency correction, laser precautions in the operating room, vascular syndromes in atypical neuralgias, and a new section on traumatic neuralgias treated by microsurgical suturing, decompression, and nerve grafts.

New photographs and drawings have been added, with the help of Ms. Jane Gilmore of the Georgetown Medical Center Educational Media Division, and, of course, we want to acknowledge the past efforts of B. John Melloni. The meticulous work and valuable advice given by the editors of The C.V. Mosby Company are important to this effort, and they are appreciated.

We welcome three new authors in this edition. All contributors have been selected because of their competence in the field. Each has devoted his efforts to one chapter. It is to them that any credit for this work is due. Without exception, they have been generous with their time and efforts.

**Gustav O. Kruger**

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## CHAPTER 1

# Principles of surgery

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H. DAVID HALL

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Oral and maxillofacial surgery is unique among surgical specialties in that it identifies strongly with dentistry. This is a proper relationship since a thorough knowledge of dentistry is a prerequisite for a surgical specialty that deals with diseases, injuries, and defects of the oral and maxillofacial region. But oral and maxillofacial surgery is no less a surgical specialty than urology, for example. The common link between oral and maxillofacial surgery and other surgical specialties is that the same surgical principles apply to therapy. Thus the principles that guide the general surgeon in treating appendicitis are the same as those that guide the oral and maxillofacial surgeon in treatment of an odontogenic cellulitis. The fact that details of application of surgical principles may differ to accommodate local peculiarities sometimes obscures this relationship.

However, the casual observer may think that some surgical principles do not apply to a particular surgical specialty such as oral and maxillofacial surgery. An example is the principle of asepsis, because aseptic technique clearly is different for abdominal operations and oral operations. Aseptic technique has been modified to take into account differences in the response of a wound in each area; the general principle of asepsis is the same. Thus the challenge for each surgical specialist is not only to know surgical principles but also to know how they apply to a particular area of interest.

## ASEPSIS

Prior to the mid-nineteenth century, surgeons made no specific efforts to reduce bacterial contamination of the wound. Yet wounds often healed after primary closure. As hospitals became more prevalent, patients with septic conditions were housed with other patients, since isolation procedures had not been developed. With increased opportunities for wound contamination, especially from these patients, wound infection became commonplace. Even before Lister made his contribution to antisepsis, Semmelweis and O.W. Holmes observed that puerperal fever was spread from infected to uninfected parturient women in the obstetrical wards by their doctors. The simple act of washing hands between patients, thereby reducing the number of virulent bacteria introduced into wounds, greatly reduced puerperal sepsis. Although these doctors did not know what it was that caused the infections, they clearly understood the nature of the transfer. A few years later Pasteur developed the germ theory of disease. This concept provided a basis for understanding wound sepsis. Lister grasped the significance of Pasteur's work and began development of aseptic surgical technique.

Even with modern aseptic surgical technique, some bacteria get into wounds. But wounds are able to tolerate a limited number of bacteria without becoming infected. Several factors determine the

maximum number of bacteria that a wound will tolerate. One important factor is local immunity, and this varies with the area of the body. The oral and maxillofacial region and perineum, for example, have a greater resistance to infection than other regions of the body. Relatively large numbers of indigenous bacteria can be introduced into oral or perineal wounds and rarely cause infection. This is fortunate since it is virtually impossible to reduce bacterial contamination in the mouth or perineum to levels common for other areas of the body. The current aseptic techniques for the oral and maxillofacial area rely principally on prevention of wound contamination by foreign and especially more virulent bacteria.

There are also other factors that determine the maximum number of bacteria with which wounds can become contaminated before developing infection. The body's general resistance to infection is clearly an important factor. Diabetes is an example of a common condition in which there is an increase in susceptibility to infection. Other less common but by no means rare examples are suppression of immunity by corticosteroids or other drugs, leukemia, and uremia. Local wound factors also influence susceptibility to infection. Wound infection is more common after devitalization of tissue, as can occur with accidental injury or careless surgical technique. Thus although aseptic technique is an important factor in reducing wound infections, other factors also have an important influence on the problem. The surgeon who understands these interrelationships is able to make appropriate adjustments in patient management and maintain a low infection rate in most circumstances.

### **ANALYTICAL APPROACH TO SURGICAL CARE**

One of the more important contributions to the care of the surgical patient was appreciation of the value of an analytical approach. The essence of an analytical approach to a clinical puzzle is separation of the various problems and establishment of the relationships of the individual problems to each other. The solution often is evident at this

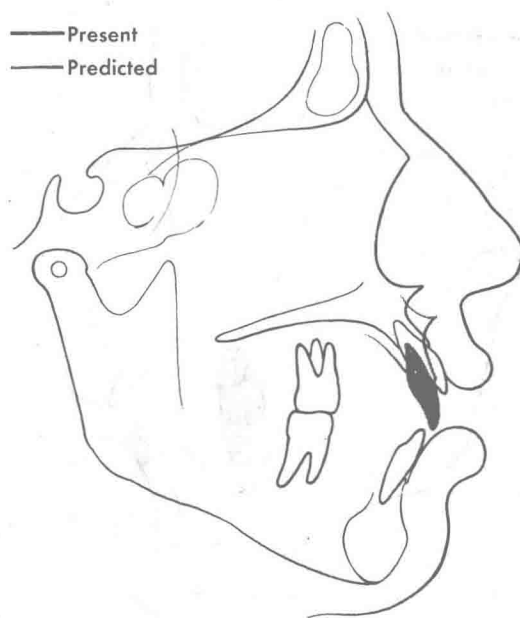
point, or a possible solution is suggested that can be tested.

The first step in the analysis of any situation is to obtain accurate data. The traditional means of establishing data is by historical, physical, and laboratory examination of the patient. Skill in application of examination technique is essential in order to obtain accurate data. For example, a common tendency of the less experienced clinician is to establish a tentative diagnosis early in the historical evaluation of a patient and then to ask leading questions in an effort to support the diagnosis. Open-ended questions would clearly provide more accurate information even if they might cause some discomfort to the clinician looking for support for an early impression. Similarly, a thorough, careful physical examination of a patient will often yield information missed by a more hurried, less orderly examination. Detection of a small sinus tract in the sulcus overlying a fracture site in a patient with delayed union is an easily missed but important finding. In particularly difficult diagnostic problems the more famous surgeons have been noted for the unhurried, careful, and thoughtful examinations they perform.

In addition to being accurate, the information must also be pertinent. This aspect of patient evaluation probably requires the greatest amount of experience for perfection. With increased knowledge of a condition, one begins to recognize which information is particularly pertinent for its diagnosis and treatment. The practitioner can then probe the more relevant areas with greater care. For example, determining that a patient with bleeding from the gingival crevice recently began taking quinidine, which can cause thrombocytopenia, has greater significance in this patient than in a patient who has an infected tooth. Thus skill in patient evaluation requires not only a knowledge of the technique of evaluation but also a knowledge of specific conditions.

Analysis of the information obtained from patient evaluation may readily yield a diagnosis but often does not. A system that lists problems based on the level of information available has a clear

advantage over a system that tends to force a premature diagnosis. The problem-oriented medical record is an example of the former system. This method of recording data, which allows identification of discrete problems and their relationships to one another, is especially useful in sorting out complex situations. It also has the advantage of reducing the chances that some problems will be ignored in developing a coordinated treatment plan. For example, a patient with an open bite may also be found to have increased lower facial height, retruded chin, lip incompetence, increased nasolabial angle, increased maxillary-alveolar bone height, increased backward rotation of the mandible, minor crowding of the dental arch, and increased curve of Spee in the maxilla (Fig. 1-1). Without a listing of all the problems, it is easy to focus only on the chief complaint of open bite or perhaps some, but not all, of the other problems. In this example, attention only to the open bite could result in a surgical procedure to close the bite by inferior movement of the anterior maxilla to permit occlusion of the maxillary incisors with the mandibular incisors. This approach to treatment, while providing a better occlusion, would fail to correct other problems and would even create a new one—changing a normal maxillary lip-to-tooth ratio to one with excessive exposure of the teeth (Fig. 1-1). On the other hand, recognition of the various problems and their relationships to each other would more likely lead to another treatment plan. A better plan would be developed if there were recognition that vertical increase in the maxillary bone rotates the mandible, creating a relative deficiency of the chin, increasing lower facial height, and causing lip incompetence. Thus LeFort I and segmental maxillary osteotomies with posterior intrusion would also close the open bite. In contrast to the anterior maxillary osteotomy alone for closure of the open bite, this plan would address the other coexisting problems. Thus a segmental maxillary osteotomy with posterior intrusion to retain the present adequate lip-to-tooth relationship could correct the open bite as well as other important abnormalities (Fig. 1-2). Specifically the



**Fig. 1-1.** Cephalometric tracing showing a plan that corrects only one of several problems—the open bite.

procedure would correct the occlusion and provide some correction for the deficient chin, increased lower facial height, and lip incompetence by allowing the mandible to rotate forward. The need for an orthodontist to align the teeth also would be more obvious with this problem-oriented approach. Thus the competent surgeon not only exercises care and thoroughness in collecting data through the patient evaluation but also organizes these data in a way that encourages an analytical evaluation of problems and thereby a more rational approach to surgical therapy.

The analytical approach is also applicable to other aspects of surgical care. Careful assessment of a patient's problems and meticulous planning for the surgical procedure usually eliminate any significant surprises during the operation. But occasional unanticipated findings or events are unavoidable. A few moments of analysis of the situation usually suggest the best course of action. A careful, thorough approach is more important than speed.