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# Preface

Arriving at the appropriate diagnosis or treatment of any condition must involve a logical thought process. An algorithm is a graphic representation of how this process should proceed. Learning to use the algorithms presented in this text not only leads to proper patient management but also helps to develop a thought process that can be applied to other diagnostic and therapeutic decisions.

It is not logistically possible to present an algorithm for every condition that might be encountered in the practice of oral and maxillofacial surgery. Therefore, the topics selected represent the more common situations that a clinician may face. It is also not possible in this type of book to present all of the detailed information that may be needed to carry out the actual treatment for the patient. Thus, in some instances it will be necessary to consult other sources for such specifics. While selected references are provided in the text, they are not meant to be all-inclusive.

When reviewing the algorithms in this book, readers will sometimes find information that differs from the approaches with which they are familiar. It is a clinical reality that there may be several different ways in which certain conditions can be successfully treated. However,

the algorithms in this book have been developed by recognized experts to assure the reliability of the recommended approaches.

All of the topics for which algorithms are presented fall within the scope of oral and maxillofacial surgery; many, however, are conditions that also are treated by general dentists. Moreover, most of the general and diagnostic algorithms have universal application. Therefore, this text should be of interest to clinicians other than oral and maxillofacial surgeons.

Even when a clinician is thoroughly familiar with the management of a particular problem and able to treat it successfully, there is a difference between knowing what to do and logically describing the diagnostic and therapeutic process. This was the challenge that we presented to the clinicians who were asked to contribute algorithms. We would like to thank them for accepting this challenge and for their excellent work in helping make this book possible.

*Daniel M. Laskin  
A. Omar Abubaker*

## Using This Book

This book is divided into 14 sections that together cover 100 topics in oral and maxillofacial surgery. Each topic consists of an algorithm and separate explanatory text. Readers should study the algorithm first, using the arrows to follow the progression of the diagnosis and/or treatment. The numbered boxes correspond to numbered text passages located on a separate page (usually opposite), where additional information is provided. The blue boxes in the algorithm contain diagnostic information, green boxes contain treatment information. Cross references in the text indicate where additional information can be found in other algorithms. Readers should use the index at the back of the book to locate specific topics of interest.

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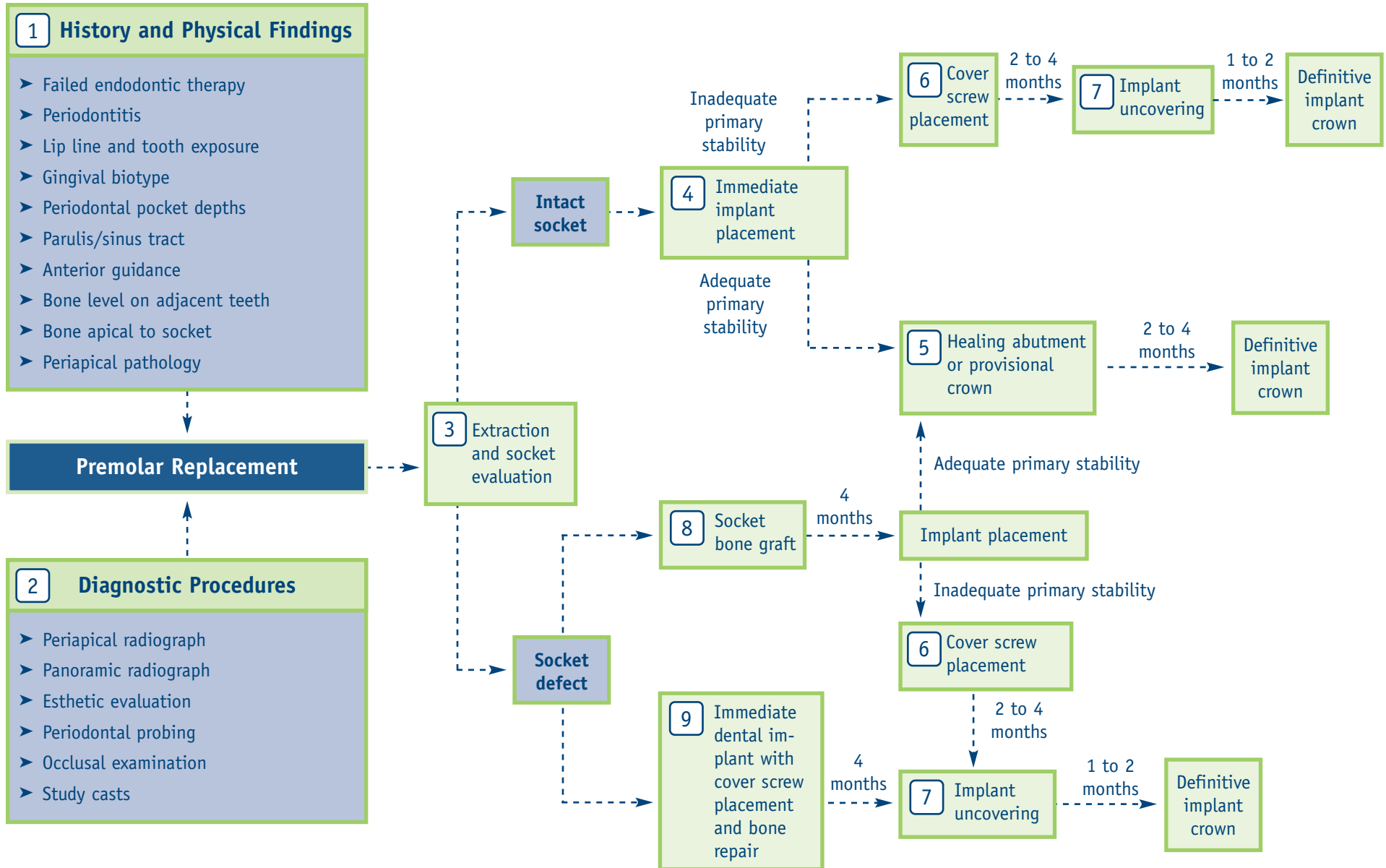
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# Implant Therapy

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**1** Management of a foreign body in the maxillary sinus often represents a significant surgical challenge because of the wide variety of objects that may be present in the antrum. Some clinical situations are clearcut, such as those following a recent complicated dental extraction, implant surgery, or traumatic injury to the maxillary sinus. However, the majority of foreign bodies may be asymptomatic and not discovered until considerable time has elapsed since the inciting event.<sup>1</sup> Symptomatic patients with a foreign body located in the maxillary sinus may exhibit a clinical picture consistent with maxillary sinusitis. Signs and symptoms include nasal congestion, rhinorrhea, purulent nasal discharge, fever, facial pressure and/or pain overlying the maxillary sinus, headaches, and dental pain (see algorithm 72).

**2** When the history or clinical presentation suggests a maxillary sinus foreign body, radiographic evaluation is essential for accurate identification and localization. Foreign body migration occurs due to mechanical forces or mucociliary function,<sup>2</sup> and therefore radiographic localization is crucial, especially if significant time has elapsed since the foreign body was introduced or if the available radiographs are not current. A panoramic radiograph in combination with a lateral cephalograph often reveals the identity and location of the foreign body in the sinus. Computed tomography (CT) may be indicated in complicated cases involving traumatic injuries or infections or in cases where a foreign body is suspected but the diagnosis is not confirmed with traditional radiographs.

**3** The most common foreign body in the maxillary sinus is a displaced root or root fragment following extraction of a maxillary molar. Maxillary molars that have complicated root structures and are associated with a well-pneumatized maxillary sinus increase the risk of this

complication. Even when meticulous dentoalveolar surgical techniques that avoid apical pressure are used when removing fractured roots, displacement can still occur. Appropriate imaging should be obtained to locate and identify the size of the root fragment.

**4** Root fragments less than 3 mm in size may be observed within a sinus free of infection; the removal of such fragments may increase the potential for sinus complications. If the root fragment is very small, an attempt to irrigate the maxillary sinus and retrieve the root tip with suction through the oroantral communication is recommended. Attempts at vigorous instrumentation or surgical enlargement of the communication are fraught with problems and should be avoided. Antibiotic therapy, generally clindamycin, a fluoroquinolone, a macrolide, or amoxicillin and clavulanate, should be administered and the area allowed to heal. Generally, with small root fragments, uneventfully healing will occur.

**5** Root fragments greater than 3 mm in size or those associated with an infected sinus or persistent oroantral fistula require surgical removal. Antibiotic therapy should be initiated in cases associated with sinusitis or oroantral fistulae.

The surgical approach selected for removal of maxillary sinus foreign bodies, including displaced root fragments, depends on the experience of the surgeon and the location and size of the foreign body. Traditionally, variations of the Caldwell-Luc approach via the canine fossa are most often used to access the antrum.<sup>3-5</sup> This technique remains the approach of choice for large or complicated foreign bodies due to the optimal access and minimal morbidity of the procedure. Lateral approaches, similar to those used in maxillary sinus augmentation, may be more useful for procedures requiring

removal of posterolaterally located implants and grafting materials.<sup>6</sup> Recently, endoscopic techniques via a canine fossa or a middle meatal antrostomy have been successfully used to remove maxillary sinus foreign bodies. These approaches offer minimally invasive options for smaller or more medially located foreign bodies within the antrum or for those displaced into the middle meatus, nasal cavity, or ethmoid air cells.<sup>7-9</sup> When an oroantral fistula is present, it can be treated at the time the foreign body is removed (see algorithm 74).

**6** Dental implants are increasingly reported as a common foreign body in the maxillary sinus. Patients of advanced age with extensively pneumatized maxillary sinuses are being rehabilitated with dental implants in the molar region; one complication associated with this clinical situation can be the migration of a dental implant into the maxillary antrum.<sup>7,10,11</sup>

**7** Generally, dental implants that have migrated into the maxillary sinus should be removed with an appropriate technique as described in number 5. Significant migration of dental implants has been reported, and adequate preoperative imaging is paramount for appropriate management.<sup>12</sup> The Caldwell-Luc approach remains an excellent choice for this problem. However, if significant implant migration has occurred, endoscopic assistance should be considered.<sup>7,10</sup>

**8** Endodontic treatment has been reported as a frequent cause of maxillary sinus foreign bodies.<sup>13-15</sup> Foreign material ranging from canal-obturing materials (eg, silver points, gutta-percha, endodontic sealant, and files) to rotary instruments used in endodontic preparation may be displaced into the maxillary sinus during endodontic therapy.

*Continued on page 192.*



