Surgical Complications After Implant Placement

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KEYWORDS

• Bleeding • Infection • Dental injury • Mandibular fracture
• Displacement of the implant • Anatomic concerns • Prevention • Management

KEY POINTS

- Many of the issues that arise at surgery can be traced to the preoperative evaluation of the patient and assessment of the underlying anatomy.
- Prevention of all surgical complications is impossible; however, many can be minimized with proper planning.
- Failure to recognize variations in the regional anatomy of the maxilla and mandible can be the cause of major bleeding during implant placement.
- Consultation with restorative colleagues, computed tomography when the anatomy is in question, and a thorough review of the patient's medical history will help.

INTRODUCTION

Any number of complications can occur during or after the placement of dental implants. Most are immediately apparent; however, some can occur much later. Most complications can be traced to treatment planning and execution and are therefore preventable. Christman and colleagues[1] recommended the use of a safety checklist before the placement of implants; this checklist includes a review of the patient's medical and dental history, a diagnostic workup, a determination of the periodontal stability of adjacent teeth, and effective communication with restorative partners. We agree that a thorough review of all of the patient's records before the procedure will help to prevent some of the common complications seen during implant placement. This article reviews some of the more common and a few of the more severe surgical

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complications associated with the placement of implants. Additionally, we discuss short-term surgical complications, those seen either at the time of placement or during the weeks or months thereafter, with an emphasis on their management and prevention. In a few cases, the discussion also includes longer term complications related to the surgical procedure. When the material overlaps with that presented in other articles in this issue, the reader is referred to those works.

COMMON AND UNCOMMON COMPLICATIONS WITH IMPLANT PLACEMENT

Bleeding

Minor bleeding is inherent during the placement of dental implants, as with any surgical procedure. However, major bleeding is uncommon and can be life threatening. The causes of major bleeding may be related to systemic issues or regional anatomy. A wide variety of systemic issues can increase bleeding in a given patient. They may be broadly divided into those related to medications and those related to an underlying bleeding coagulopathy. Although a complete discussion of the management of every type of congenital or developmental bleeding disorder is beyond the scope of this discussion, it is worth noting that many patients with coagulopathies can undergo routine dentoalveolar surgery either in an office or in a hospital environment. Perhaps the most common potential bleeding issue seen in an office setting occurs with patients who are taking warfarin. These patients can undergo implant dentistry according to the protocols developed for dentoalveolar surgery. Most guidelines suggest that patients with an International Normalized Ratio of less than 3.5 can have a simple single extraction without any adjustment in anticoagulation. For patients taking warfarin, the overall frequency of persistent bleeding (2%) is low when all dental procedures are considered.[2] However, when extractions are combined with placement of an implant, the incidence of persistent bleeding increases to 4.8%.[2] This suggests that patients taking warfarin are at a higher risk of postoperative bleeding after simultaneous extraction and implant placement are combined if coagulation levels are not adjusted before the procedure. When such adjustments are not possible, the extraction and implant placement can be performed as a staged procedure.

It is important to understand that many patients who require anticoagulation but do not have prosthetic heart valves may be taking a newer class of anticoagulant drugs. The mechanism of action of these newer medications is different from that of warfarin: they directly inhibit either thrombin (dabigatran) or factor Xa (apixaban and rivaroxaban). The half-life of the drugs currently on the market ranges from 9 to 28 hours. The number of patients using these medications is increasing, and bleeding in association with dentoalveolar surgery is a distinct possibility. A systematic literature review concluded that the evidence and the recommendations of published guidelines all point to the same conclusion: Oral antithrombotic medication, including dual antiplatelet therapy, should not be interrupted for simple dental procedures.[3] Currently, there are no established protocols for managing patients taking these drugs who are undergoing dentoalveolar surgery, and the reversal of these newer medications is difficult.[4,5] For these reasons, we suggest a consultation with the patient's physician so that perioperative anticoagulation scenarios can be discussed.

Anatomic concerns

Failure to recognize variations in the regional anatomy of the maxilla and mandible can be the cause of major bleeding during implant placement. In some cases, the bleeding may have life-threatening consequences. The primary focus of the rest of this section is to review the specific anatomy of the maxilla and mandible and its relationship to cases of bleeding during and after surgery.