

COMPLICATIONS INVOLVED IN TOOTH EXTRACTIONS

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Abstract

Tooth extraction is a common dental procedure performed for various reasons, including severe decay, periodontal disease, orthodontic needs, or impacted teeth. While generally considered safe and routine, tooth extractions can involve a range of complications that may impact the patient's recovery and overall oral health. This article explores the common and uncommon complications associated with tooth extractions, highlighting their causes, risk factors, prevention strategies, and management approaches. Complications may be intraoperative or postoperative. Intraoperative issues include excessive bleeding, root fracture, injury to adjacent teeth or tissues, and displacement of the tooth or root fragments into adjacent anatomical spaces such as the maxillary sinus. Postoperative complications are more frequent and include alveolar osteitis (dry socket), infection, prolonged bleeding, delayed healing, nerve injury resulting in paresthesia, and trismus. Systemic complications, although rare, may occur in patients with underlying medical conditions or compromised immune systems. Factors influencing the likelihood of complications include the difficulty of the extraction, the patient's age, oral hygiene status, smoking habits, and systemic health conditions such as diabetes or bleeding disorders. Preventive measures such as proper surgical technique, thorough preoperative assessment, and appropriate postoperative care instructions are essential to minimize risks. This article underscores the importance of clinician awareness and patient education in reducing complications. Timely diagnosis and intervention are critical for effective management and improved outcomes. By understanding the potential complications and their underlying mechanisms, dental professionals can ensure safer, more predictable tooth extractions and enhance patient care quality.

INTRODUCTION

Tooth extraction is a routine dental procedure performed when a tooth is severely damaged, decayed, or contributing to crowding. Extractions are generally classified into two types: simple extractions, which involve the straight forward removal of a visible tooth with minimal effort, and surgical extractions, which are more complex and may require an incision in the gum to access a tooth that is broken or impacted within the jawbone. The procedure is usually performed under local anesthesia, though IV sedation or general anesthesia may be used for more complex cases or for patients with anxiety. Following removal, a blood clot naturally forms in the socket to initiate healing. In some instances—particularly when a dental implant is planned—a bone graft may be placed to maintain jawbone structure.

During the recovery period, patients can expect some mild bleeding and discomfort, especially within the first few hours. Swelling around the extraction site is also common and typically peaks within the first 48 hours

after the procedure.

Dental extractions are routine dental treatments offered by a range of practitioners with varying degrees of experience in oral surgery and various clinical settings. While modern dentistry focuses on patients maintaining their dentition for as long as possible, dental extractions are still commonly performed. Therefore, it is crucial that all practitioners performing dental extractions are aware of the basic principles of this treatment to perform these procedures safely and effectively.

Although tooth extraction is a common and generally safe dental procedure, it is not without potential risks. While most patients recover without issues, some may experience post-operative complications that can hinder healing and cause significant discomfort. These complications can range from mild and self-limiting to severe and medically significant, depending on the patient's overall health, the complexity of the extraction, and the aftercare provided. Conditions such as dry socket, infection, or prolonged bleeding can arise if

proper care isn't taken. Being aware of these risks is key to taking appropriate precautions and promoting a smooth recovery.

If you've recently undergone a tooth extraction or are preparing for one, understanding what to expect during the healing process is essential. Knowing how to properly care for the extraction site and when to seek professional help can greatly improve your outcome. In this article, we'll cover the most common complications associated with tooth extraction, offer tips on minimizing post-surgical risks, and explain when it's time to contact your dentist for further evaluation and treatment.¹

ANATOMY AND PHYSIOLOGY

The relevant anatomy of a dental extraction will depend on the dental extraction site and is critical in considering appropriate anesthesia techniques and possible risks of a dental extraction.

Maxilla

The maxilla is the term given to the upper jaw. The maxilla makes up part of the mid-face, encasing the upper teeth at its inferior aspect and separating the oral cavity from the nasal floor and maxillary sinuses at its superior aspect. The cortical plates of the maxilla are thinner than those in the mandible, with the buccal cortices being thinner than the palatal cortices. The thinner buccal cortex facilitates better penetration of local anesthesia via a supra-periosteal infiltration technique. The softer, thinner bone allows easier expansion of the dental socket, facilitating tooth removal usually with more ease than in the mandible. The maxilla is more highly vascularised than the mandible, contributing to quicker and better post-extraction healing.

Mandible

The mandible refers to the lower jaw. The mandibular shape can often be simplified as a 'horseshoe' shape. The body of the mandible is the horizontally curved portion of bone that, with the symphyseal area anteriorly, holds the lower teeth. The body of the mandible ends posteriorly at the angle of the mandible, and the bone then continues vertically as the mandibular rami². The superior aspect of the mandible consists of the coronoid

processes. The anterior aspect of the coronoids is a continuation of that of the ramus, and the posterior aspect of the coronoid makes up one side of the mandibular notch. Posterior to the coronoid processes, still on the superior aspect of the mandible, is the condylar heads that sit in the glenoid fossae of the temporal bone.

The mandibular bone has thicker cortices and trabecular bone and is less vascularised than the maxilla, tending towards more difficult extractions and slower healing response. On the medial aspect of the mandibular rami sits the mandibular foramen. Adjacent to the mandibular foramen sits a bony protuberance called the lingula. The lingula is palpable in the oral cavity and provides an important anatomical landmark for administering an inferior alveolar nerve block.

Nerves

Understanding the anatomy of the sensory network, which innervates the teeth, surrounding bone, and soft tissue is crucial in understanding how to make an extraction comfortable for a patient. The fifth cranial nerve (CN V), also known as the trigeminal nerve, divides into three main branches. The first branch (V1) is the ophthalmic nerve, which innervates the forehead, eyes, and nose. The second branch (V2) is the maxillary nerve, a sensory nerve that supplies sensation to much of the middle-third of the face and subdivides into the superior alveolar nerves, which provide sensation to the maxillary dentition.

The posterior superior alveolar nerve branches directly off the maxillary nerve and innervates the maxillary molar teeth and adjacent buccal gingivae. Another division of the maxillary nerve is the infraorbital nerve, which subdivides into the anterior superior alveolar nerve and the middle superior alveolar nerve, innervating the anterior teeth and the premolars along with their surrounding gingivae, respectively.

The innervation of the hard palate is also supplied by branches of the maxillary nerve, specifically, the greater palatine and nasopalatine nerves, which branch further to supply sensation to the palatal bone.

The anesthesia of these nerves and their subdivisions facilitates the extraction of an upper tooth. Common anesthesia techniques for maxillary teeth include buccal and palatal infiltrations and regional nerve blocks.

The mandibular nerve is the third branch of the trigeminal nerve (CN V3). The mandibular nerve gives sensory innervation to the lower face, including the mandible, the lower teeth, the oral mucosa, the anterior two-thirds of the tongue, the chin, and the lower lip. The mandibular nerve divides into an anterior and posterior trunk³. The posterior trunk divides into the lingual and inferior alveolar nerves. The lingual nerve innervates the anterior two-thirds of the tongue but does not provide the sensation of taste. The inferior alveolar nerve innervates the mandibular teeth, their mucoperiosteum, and the lower lip and chin.

The inferior alveolar nerve enters the mandible via the mandibular foramen and travels within the bone in the mandibular canal. It exits the bone again via the mental foramen as the mental nerve. The anesthesia of the inferior alveolar nerve before it enters the bone via the mandibular foramen constitutes a successful inferior alveolar nerve block.

The lingual nerve enters the oral cavity separately from the inferior alveolar nerve, running anterior and inferior to the medial surface of the mandible and passing adjacent to the apices of the mandibular third molars. This is relevant when considering the extraction of mandibular third molars and the associated risks.

Maxillary Sinus

Sinuses are air-filled spaces lined with mucosa. The maxillary sinuses (or antra) are one of four pairs of paranasal sinuses in the skull. The maxillary sinus communicates via its ostium with the middle meatus of the nasal cavity.

Teeth

The anatomy of the teeth themselves is a crucial consideration when planning a dental extraction. The root morphology of each individual tooth must be considered - including the number of roots, divergence or convergence, root length, root shape, communication of roots with adjacent structures, dilaceration of the roots, and any existing root filling or treatment. The

crown must also be considered, especially when assessing caries, as this will affect the feasibility of removing the tooth as a whole. Finally, the condition of the surrounding bone must be assessed, as any resorption of this bone due to apical pathology or periodontal disease will be key in determining the complexity of a dental extraction.

INDICATIONS

A dental extraction can be offered to patients for a multitude of reasons. While the emphasis is always placed on retaining as much of the dentition as possible, there are cases where this is no longer feasible or in the patient's best interest.

➤ Dental Caries

When dental caries have progressed significantly, there is often not enough sound tooth tissue to allow for a restoration of any kind. This would render a tooth unrestorable, leaving extraction as the only viable treatment option. Caries are widely accepted as the primary reason for tooth removal.

➤ Pulpal/Apical Pathology

A common sequela of dental caries is pulpal and periapical pathology. A dental extraction would be indicated for a tooth with pulpal, or apical pathology that cannot be resolved with endodontic treatment or that would not be restorable following the endodontic treatment⁴. In some cases, a dental extraction is indicated when the patient chooses not to have endodontic treatment but would still like the tooth to be treated.

➤ Severe Periodontal Disease

Severe periodontal disease leads to the destruction of bone in the maxilla or mandible. Once a tooth has lost most of its bony support, it will become mobile and often an irritation to patients. As there are few options for bony regeneration, extraction is often indicated.

➤ Fractured Teeth

Fractured teeth that cannot be appropriately restored or retained will require extraction.

➤ Retained Dental Roots

Retained dental roots can be present after crown fractures due to caries or trauma or following incomplete dental extraction. Some situations will allow

for the retention of a dental root, such as for prosthetic reasons or due to the risk of damaging surrounding structures in an attempt to retrieve them. However, they have the potential to cause infection and pain and are thus commonly advised for pre-emptive removal.

➤ **Impacted Teeth**

Impacted teeth are those that cannot erupt due to a physical barrier. Teeth that are impacted against other teeth or within the jaw are often considered for removal. If left impacted within the jaw, impacted teeth follicles have the potential for cystic change.

A joint decision should be had with the patient as to whether prophylactic extraction or radiographic monitoring is preferable. Impaction of teeth is seen most commonly with teeth late in eruption chronology - namely mandibular third molars, upper canines, and lower premolars. National clinical guidelines often govern the specific indications for mandibular third molar removal.

➤ **Supernumerary Teeth**

A supernumerary tooth is defined as a tooth that is additional to the normal series. They present most commonly in the anterior maxilla⁵. Supernumeraries can cause a range of clinical issues, including failure of eruption or displacement of a permanent tooth, dental crowding, and pathology. If retention of a supernumerary tooth is not considered beneficial, then it is often planned for removal.

➤ **Orthodontic Extractions**

Teeth are often considered for extraction for orthodontic reasons, often to create space in the dental arch to allow movement of the teeth into a more favorable position. A plan for which teeth are to be removed should be formulated by an orthodontist.

➤ **Pre-prosthetic Extractions**

Extraction of some teeth can be considered if it contributes to a better-fitting patient prosthesis or if teeth are considered to have a poor enough prognosis that they will later on adversely affect the suitability of a prosthesis.

➤ **Tooth in Fracture Line**

When a patient sustains a mandibular fracture, the pattern of this fracture will be assessed clinically and

radiographically. If the fracture line is seen to pass through a tooth considered a potential source of infection, a possible inhibitor to the fracture healing, or when the tooth itself is fractured, removing the tooth may be regarded as prudent. This is usually done at the time of surgery for the fixation of the mandibular fracture.

➤ **Teeth with Associated Pathology**

Teeth associated with pathologies, such as cysts of the jaws or malignancies, may be recommended for extraction.

➤ **Prior to Radiotherapy**

Patients undergoing radiotherapy, often for cancers of the head and neck, are usually required to have a dental assessment before commencing radiotherapy. This is to allow the identification of teeth with a poor prognosis or the potential to cause symptoms or infection in the near future⁶. This is required as dental extractions in the irradiated patient carry a risk of osteoradionecrosis of the jaws, which should be avoided where possible.

CONTRAINDICATIONS

There are few absolute contraindications to dental extraction, especially when presented with an acutely symptomatic tooth. However, there are circumstances where a patient should be better optimized before extraction is performed. In all cases, a thorough risk vs. benefit discussion of tooth removal must be had with the patient.⁷ This discussion must encompass an understanding of the patient's medical background and the specific tooth or teeth being extracted.

Uncontrolled Medical Conditions Which Impact Dental Extractions

In all cases where a patient presents with an uncontrolled medical diagnosis, all reasonable efforts should be made to liaise with the patient's medical team or general medical practitioner to allow them to control the patient's condition. Once this has been achieved, it would be suitable to reassess the patient for their extraction.

Neurological Conditions

Conditions such as uncontrolled epilepsy put patients at an increased risk of aspiration or injury if a seizure occurs during an extraction.

Patients with a history of hypertension or cerebrovascular disease are at a higher risk of stroke. It is important to clarify if they have had any previous transient ischaemic attacks (TIAs). If a patient is at an increased risk of stroke without any medical management, it is advisable to resolve this before dental extractions. It is important to note that while not a contraindication to dental extractions, many stroke-risk or post-stroke patients are on blood thinning medication, and appropriate hemostatic measures should be considered.

Respiratory Conditions

Respiratory conditions, such as chronic obstructive pulmonary disease (COPD), are not a total contraindication to dental extractions. However, many of these patients will prefer to be treated sitting up due to breathlessness experienced when lying flat. Respiratory disorders can be a contraindication to dental treatment under sedation due to respiratory depression caused by the drugs used for dental sedation. This should be assessed with a thorough pre-sedation assessment of the patient.

Cardiovascular Conditions

Cardiovascular disease (CVD) is a term that covers a range of conditions, including ischaemic heart disease, infective endocarditis, hypertension, and dysrhythmias. Infective endocarditis (IE) is often discussed in the context of dental treatment. Prior to 2008, a range of clinical guidelines recommended antibiotic prophylaxis for certain cases where patients were at risk of developing IE. This recommendation has broadly been dropped, as the risk of developing IE directly due to tooth extraction was thought to be overstated. However, patient-specific considerations should be discussed with the patient's cardiologist before extraction is performed.⁸

Renal Impairment

Patients who have severe renal impairment can be complicated to manage. They are often at risk of increased bleeding and contracting infections. Where possible, it is appropriate to avoid surgical intervention for these patients. Due to their increased risk of infection, antibiotic prophylaxis is also often

appropriate.⁹ Renal patients may also be immunosuppressed if they have received a transplant. A clear understanding of a patient's renal diagnoses and liaising with the patient's renal team is advisable before dental extraction.

Immunocompromised Patients

Immunocompromised patients are at risk of developing systemic infections following invasive dental treatment such as extractions. They must be carefully handled, and liaison with their medical teams is advised. Antibiotic prophylaxis in this group is not necessarily required as there is no clear evidence that prophylactic antibiotics reduce post-operative infection. Each case should be assessed individually, and appropriate advice should be sought.¹⁰

Other conditions, such as hematological and hepatic conditions and diabetes, pose similar issues relating to dental extractions, as outlined above.

Medical Factors

➤ *Antiresorptive Agents*

Antiresorptive agents, such as bisphosphonates and denosumab, are primarily used to treat osteoporosis, cases of hypercalcemia related to malignancy, multiple myeloma, Paget's disease, and other skeletal changes. This group of drugs inhibits bone remodeling, which can reduce the healing of an extraction socket¹¹. The condition of a non-healing extraction socket - which may include exposed bone - is known as medication-related osteonecrosis of the jaws (MRONJ). A thorough dental assessment should be conducted before a patient begins a course of antiresorptive drugs. This allows any tooth with a poor prognosis to be removed before introducing MRONJ risk. However, it cannot always be avoided that a tooth requires extraction during or after antiresorptive treatment. Therefore, in these scenarios, a thorough risk vs. benefit discussion must be had with the patient prior to planning for an extraction.¹²

Bisphosphonates can be administered in various ways, including orally and intravenously. A thorough history of bisphosphonate type, administration, and duration of use must be taken, as this will dictate the patient's risk of developing MRONJ. Higher risk factors have been

identified, including over five years of use, concurrent steroid use, and advanced patient age.¹³

Drug holidays are not advised with these drugs, as omitting doses does not negate the cumulative effect of these drugs. If a tooth does need to be removed following bisphosphonate therapy has begun, a thorough history should be taken from the patient, liaising with their medical team should be done if appropriate and clear consent and follow-up should be conducted with the patient.

➤ **Steroid Use**

Steroids are prescribed to patients for a variety of reasons. Over time, they impair healing, which must be considered with dental extractions. Additionally, some evidence suggests the benefit of doubling one dose of steroids prior to extraction to compensate for adrenal suppression. However, this depends on the type and dose of steroid a patient takes; if required, liaising with the patient's steroid prescriber can be advisable.¹⁴

➤ **Anticoagulants and Antiplatelet Drugs**

Anticoagulants and antiplatelets are widely prescribed, so familiarity with them and their impacts on dental treatment are imperative. A clear understanding of why a patient is on such a drug and their medical background is essential when considering omitting doses of such medication to allow for dental treatment. Evidence suggests that omitting doses of anticoagulants and antiplatelets is not routinely indicated, as the risk of missing doses on the patient's overall health must be balanced against the risk of oral bleeding, which can usually be locally controlled. In all cases of a patient taking an anticoagulant or antiplatelet, local hemostatic measures should be taken following dental extractions¹⁵. Warfarin management is straightforward, as the international normalized ratio (INR) test is easily done in dental surgery and provides a quantitative measure of the patient's bleeding tendency. Evidence indicates that if a patient has an INR of under 4.0, they are suitable for dental extractions in the primary care setting and that over 4.0, they should be treated in secondary care.¹⁶ The INR reading should be taken within 72 hours of dental treatment to be considered valid. Local hemostatic

measures should be used routinely for patients on warfarin.

The introduction of novel oral anticoagulants (NOACs) has partially replaced warfarin usage. There is no INR-equivalent test for the NOACs; therefore, the management of these patients is a clinical judgment.

Local hemostatic measures include the use of oxidized cellulose materials in extraction sockets and the use of sutures to help minimize post-operative bleeding.¹⁷

➤ **Radiotherapy**

Patients undergoing or undergoing radiotherapy, especially in the head and neck region, are at risk of developing osteoradionecrosis (ORN).¹⁸ Similarly to MRONJ, osteoradionecrosis presents as a non-healing area of bone that may be exposed to the oral cavity. A thorough dental assessment should be done before commencing radiotherapy. A thorough risk vs. benefit discussion with the patient is critical in this scenario, and specialist input or referral may be required.

Tooth-specific Factors

Proximity to Vital Structures: Proximity to the inferior dental nerve (IDN) is a common reason for deciding against dental extractions, primarily wisdom teeth. Radiographic signs of mandibular third molars close to the IDN include banding of the roots, loss of cortication of the IDN, and deviation of the IDN. Cone beam computerized tomography is useful in cases where the relationship between a mandibular molar and the IDN needs further investigation and visualization. The introduction of coronectomy techniques, where the coronal portion of the crown is removed to below the level of the cemento-enamel junction, and the roots brought to at least 3 mm below the level of the surrounding bone, has provided an alternative treatment to total extraction of the tooth in scenarios where there is concern over IDN injury risk.

Proximity to the antral sinuses can be a reason for caution when planning an extraction due to the potential to create an oroantral communication (OAC). However, if a tooth is acutely symptomatic, a high risk of an OAC may not be a sufficient reason to avoid extraction. Radiographic signs that a root apex sits in the sinus include deviation of the sinus floor, a lack of

continuity of the sinus floor, and long roots visually invading the antral space. A clear consent process with the patient is key in these scenarios.

EQUIPMENT

Dental Anesthesia Equipment:

Elevators : Elevators are instruments used partly to sever the periodontal ligament from the tooth to be extracted. They are also used to lift the tooth coronally out of the socket,

Coupland Elevators: Coupland elevators come in three sequential widths: Couplands 1, 2, and 3. They all have a straight tip

Warwick James Elevators: Warwick James elevators have three iterations: straight, left-curved, and right-curved.

Cryers: Cryers are available in left- and right-curved, similar to Warwick James elevators

Luxators: Luxators look similar to elevators; however, they are used with different aims.

Forceps: Dental extraction forceps consist of three main parts: the handle, the hinge, and the beaks. The beaks are parallel to the handle in maxillary forceps.¹⁸

Scalpel: The most commonly used scalpel in dentistry is the 15-blade. The 15-blades are commonly used for fine skin incisions and are therefore frequently used in dermatology.

Surgical Handpiece and Burs : Surgical handpieces are used with burs to remove bone during surgical extractions.

Additional Equipment Considerations:

Additional equipment, such as personal protective equipment, suction, and appropriate lighting, must also be utilized for effective treatment.

PREPARATION

A thorough consultation should be conducted with a patient before a dental extraction is performed.¹⁹ Ideally, the consultation and the treatment should be performed on separate occasions to allow the patient time to confirm that they are happy to proceed with the treatment.

TECHNIQUE OR TREATMENT

This section aims to provide an overview of techniques

for each sequential step of performing a routine dental extraction. This assumes that the steps outlined in the previous 'preparation' section have all been carried out.²⁰

Anesthesia

An appropriate anesthesia technique should be chosen according to which tooth is anesthetized.

Luxation/Elevation

Each tooth will require a different approach. However, many teeth will require some elevation or luxation.

Forceps

Forceps should be chosen based on which tooth is being removed. Forceps should be applied as apically as possible to avoid placing undue stress on the coronal portion of the tooth, which often results in a crown fracture.

Achieving Hemostasis

Following the removal of a tooth, a roll of gauze or bite pack should be placed over the socket, and the patient should be asked to bite together or hold down on the pack firmly. This pressure should be placed for a minimum of five minutes, and hemostasis should be checked before the patient can leave the chair. If hemostasis has not been achieved after a prolonged period of pressure, then local hemostatic agents should be used.²¹

COMPLICATIONS

Dental extractions, much like any surgical procedure, are not without risk. These risks must be discussed with the patient before the procedure. Frequently occurring risks after dental extraction includes pain, bleeding, bruising, swelling, and infection. Damage to the adjacent structures, like neighboring teeth, should always be mentioned, especially when adjacent teeth have restorations. Site-specific risks such as oroantral communication and inferior dental nerve injury must be mentioned if appropriate.

Pain: Pain after a dental extraction is a commonly occurring postoperative risk. This is usually managed sufficiently with over-the-counter analgesics such as paracetamol and ibuprofen. These two medications can be taken in combination to good effect. However, some patients may not find these medications sufficient and may return with a primary complaint of post-operative

pain. A thorough pain history and clinical examination should be taken in this scenario.²²

If the clinician is satisfied that there is no other diagnosis for the patient's pain, then conservative management would be advisable. Reassurance should be given to the patient that post-operative pain can take 3 to 7 days to settle. Additional analgesia can be prescribed in this circumstance, such as opioids or corticosteroids.

Another common reason for patients returning with post-operative pain is alveolar osteitis, known as dry socket. Alveolar osteitis occurs due to the breakdown of the blood clot in a socket before wound organization has occurred.²² Patients with alveolar osteitis present with post-operative pain initially resolving and then increasing 1 to 3 days following the extraction. The patient may report they saw a clot being lost when spitting out, or on clinical examination, the loss of the clot will be evident. The patient may also report noticing a bad taste in their mouth or halitosis.

Alveolar osteitis is usually treated with irrigation with saline along with the placement of a medicated dressing in the socket. Alvogyl is a commonly used dressing that acts as a local analgesic, an antibacterial, and an obtundent.

Patients may also complain of pain associated with the temporomandibular joint following an extraction. This pain is usually myofascial in nature and can be resolved with conservative management advice and time.

Bleeding: Post-operative bleeding is a normal occurrence after tooth extraction. Any medical factors in the patient's history predisposing them to prolonged post-operative bleeding should be identified early and managed according to the relevant guidelines. If a patient does continue to bleed after a prolonged period of pressure is placed on the area, then local hemostatic agents should be used to arrest bleeding.²³

Bruising: Some patients can experience bruising following dental extraction. However, this is more common with surgical extractions than simple ones. Post-operative bruising usually resolves several days following the extraction, and patients should be warned of the possibility of bruising developing to avoid concern.

Swelling: Swelling, similar to bruising, is more common with surgical exodontia. However, a patient can experience swelling after a simple extraction. Swelling should resolve in 3 to 7 days post-extraction. However, it is possible to develop a post-operative infection, which can present as facial swelling. Therefore, examining a patient who presents with post-operative swelling for all signs of systemic infection and airway patency is crucial.

Infection: As discussed, patients must be warned about post-operative infection. Despite the risk of this developing, the evidence does not suggest there is a role for routine post-operative antibiotics. Post-operative infections can be severe and are one of the more dangerous complications of exodontia.²⁴

Damage to Adjacent Teeth: The risk of damage to adjacent teeth should be minimized as much as possible through thorough pre-operative preparation and avoiding luxation or elevation adjacent to a heavily restored tooth.

Inferior Dental Nerve Injury : This risk usually pertains to mandibular third molars, although mandibular second molars can occasionally present close to the IDN. The patient should always be warned of the risk of temporary or permanent altered sensation to the lip, cheek, tongue, and teeth on the relevant side. The incidence of IDN injury is between 0.35% to 8.4%, with a permanent injury to the nerve being rare. Should a patient suffer an IDN injury, they should be followed up closely in the initial period. In most cases, recovery is seen in 6 to 8 weeks.²⁴ which can take up to two years. Ideally, complete recovery should be seen within two months, as the chance of permanent deficit increases after this period.

Oroantral Communication: Oroantral communication (OAC) most commonly occurs with maxillary molars. The primary reason for the formation of an OAC or oroantral fistula (OAF) is the proximity of a tooth's apices to the antral floor or the projection of the roots into the sinus.²⁵ OAC can also occur following the displacement of a root or apex into the sinus during extraction by the operator. Most defects less than 2 mm can close spontaneously and be managed conservatively. However, defects that are larger than this

are likely to epithelialize if left and form an OAF. This can lead to the patient developing sinusitis. These defects require surgical closure, ideally within 24 hours.

Wrong-site Tooth Extraction: Removal of the wrong tooth is one of dentistry's most regrettable complications. Poor communication, referrals, and operator exhaustion are common reasons for wrong-site surgery. This does not represent an exhaustive list of all possible complications following a tooth extraction.²⁶, but the above described are the most commonly experienced complications and make up the bulk of a routine consent discussion with patients.

CLINICAL SIGNIFICANCE

Understanding the principles outlined is imperative to perform routine oral surgery procedures. Routine dental extractions are part of the basic treatments that all qualified dentists should be able to provide; therefore, understanding the indications and contraindications of extractions, along with appropriate medical considerations, is imperative. Additionally, the ability to appropriately prepare for dental extraction and select the correct equipment and knowledge of how to use that equipment will contribute to successful treatment. The theoretical knowledge provided in this article should complement the ongoing practical experience.

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