

Textbook of Oral and Maxillofacial Surgery

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Chapter 7

Special considerations in exodontics

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Removal of Teeth for Children

The management of a child who must undergo dental extractions is based on (1) age and maturity, (2) past medical dental experiences that might influence behavior, (3) physical status, and (4) the length of time and amount of manipulation necessary to accomplish the surgery.

The age and maturity of the child often determine the type of anesthesia best suited for the intended procedure. Children below the age of reason generally are best managed under general anesthesia, since a slight amount of discomfort is always associated with the administration of a local anesthetic. During the extraction the child will experience pressures and noises associated with the necessary instrumentation. If these phenomena cannot be explained to the child, he will become anxious and rebellious. For these reasons general anesthesia is often used for the very young patient.

Good rapport must be established between the dentist and the pediatric patient. The dentist should be friendly but firm. Short, simple explanations of the sensations the child will experience should be made. At the time of needle insertion he is told that he will feel a little "stick", and during injection of the solution he is told that he will feel pressure. Forces that the child will experience during the extraction can be demonstrated by pushing gently but firmly on his shoulders. The child is told that he will feel the pushing in the area of surgery, just as he has felt on his shoulders. It should be pointed out that pushing is the only sensation that will be felt. At no time should the word "pain" be mentioned.

The child should be verbally reprimanded for unwarranted actions. During and at the end of the procedure he should be praised for his cooperation. Speaking to the child in a friendly, understanding manner throughout the procedure will greatly enhance the efficacy of "verbal anesthesia".

Scheduling the pediatric patient in the morning is desirable. At this time he is less likely to be tired and difficult to manage. Delays should be eliminated as much as possible between the time the child enters the office and the initiation of treatment. Delays allow only for the development of apprehension. Premedication with a sedative is indicated if the child appears apprehensive. Such premedication will be helpful with the administration of a local as well as a general anesthetic. A sedative is indicated also if a lengthy procedure such as removal of supernumerary teeth is planned. A child will tend to become restless and unmanageable during prolonged procedures.

At no time should the child be allowed to see the instruments necessary for anesthesia and surgery. A Mayo stand is placed behind the chair and the instruments brought to the mouth from behind and below to keep them out of the child's visual field. Small syringes and extraction forceps are available that can be more easily hidden, but they are by no means necessary for the successful management of the pediatric patient. One example regarding the advisability of keeping instruments out of the child's view involves a youngster who became hysterical at the sight of a suture needle after having sat quietly throughout multiple extractions. On questioning the patient it was discovered that during the previous year the child had lacerated his scalp, which required suturing. The child associated the needle with the pain experienced during the suturing of his scalp and related it to the current operation.

In general, the removal of deciduous teeth is not difficult; it is facilitated by the elasticity of young bone and the resorption of the root structure. Children's upper and lower forceps can be used for the removal of all deciduous teeth. These forceps have the design of the universal upper and lower forceps (Nos 150 and 151). If children's forceps are not available, deciduous teeth can be removed with the forceps used for the removal of their succedaneous analogues. However, the "cowhorn" (No 16) forceps is not used for the extraction of lower deciduous molars because the sharp beaks of this forceps could cause damage to the unerupted premolar teeth.

The maxillary and mandibular six anterior teeth are removed by luxation to the labial side, followed by mesial rotation, and then pressure in the direction of removal. Because of the lingual position of the erupting permanent incisor teeth, little can be gained by placing lingual pressure on these teeth. The maxillary and mandibular molars are luxated to the buccal and lingual areas and delivered to the mesial or lingual. Frequently, a mesial or distal path of exit is necessary because of the root formation.

Adequate radiographs are invaluable for the removal of any deciduous tooth. The presence and position of the permanent successor must be established as well as the status of the root formation of the deciduous tooth that is to be removed. Many times the resorption of the deciduous root is unequal, leaving a long, thin root portion. If a root is fractured during the extraction, it should be removed by the judicious use of root exolevers or a small curet. The Potts elevators also are valuable here. Care must be exercised not to injure the crown of the permanent tooth or its surrounding bony support. If the removal of the deciduous root tip jeopardizes the permanent tooth, it is better to leave the root tip intact. It will resorb or can be removed at a later date without jeopardy to the permanent tooth.

Occasionally the radiograph will demonstrate that the permanent premolar is wedged tightly between the bell-shaped roots of the deciduous tooth. This occurs most often in a deeply carious tooth of a young patient in which no deciduous root resorption has occurred. Care must be taken that the succedaneous tooth is not removed with the deciduous tooth because of the viselike grip of the roots. If the radiograph shows this condition, the deciduous crown should be sectioned into a mesial and a distal half before a forceps is placed on the tooth to remove the two portions separately. If at any time a permanent tooth is removed during the extraction of a deciduous tooth, it should be replaced in the alveolar bone with as little handling as possible and with the operator making sure that the buccal aspect of the tooth is placed on the buccal side of the alveolus.

Selection of Anesthesia for Exodontics

The types of anesthesia available for exodontics are (1) regional or local anesthesia, (2) local anesthesia with heavy sedation or supplementation by light general anesthetic agent, and (3) general anesthesia induced intravenously or by inhalation.

Factors that determine choice of anesthesia are (1) age and physical status of the patient, (2) infection, (3) trismus, (4) emotional status of the patient, (5) nature and duration of the procedure, (6) allergies, (7) wishes of the patient, and (8) training and office equipment of the operator.

As stated previously, the very young patient is best managed under general anesthesia, usually of the inhalation type or in combination with small doses of intravenous barbiturates. The geriatric patient metabolizes barbiturates poorly and required reduced dosages. Older patients are more likely to have systemic diseases that complicate the use of general anesthesia. The geriatric patient is often managed with local anesthesia, with judicious use of sedatives, when necessary, to relieve apprehension.

In the presence of infection, local anesthesia is not always profound. If local anesthesia is used, a nerve block is most effective and allows injection of the anesthetic solution in a noninfected area. Under no circumstances is a local anesthetic solution injection into or through an area of cellulitis. This serves only to spread the infection, with possible serious consequences. General anesthesia is often indicated in the presence of acute infection, except when the overall systemic condition of the patient precludes its use or the patient is in a toxic condition and dehydrated because of the infection. After the toxic manifestations have decreased and the patient is well hydrated, a general anesthetic may be given and the tooth removed. Before removal of any tooth during an acute infection, adequate blood levels of antibiotics should be obtained.

Trismus, the inability of the patient to open his mouth, may make the administration of a local anesthetic by the usual route difficult. Extraoral nerve blocks usually can be given. When the nerve blocks usually can be given. When the nerve block has alleviated the pain, the patient may be able to open the mouth so that the necessary extraction can be accomplished. Ethyl chloride sprayed on the skin overlying the muscles that are in spasm may enable the patient to open the mouth sufficiently to allow the surgeon to administer a local anesthetic and to perform the extraction. Care must be taken not to freeze the tissue with the ethyl chloride spray. General anesthesia, if deep enough to obtain muscle relaxation, is valuable when the trismus is caused by infection or trauma. When ankylosis of the temporomandibular joint is present, anesthesia can be accomplished by extraoral blocks or by performing a tracheostomy and administering a general anesthetic. If a general anesthetic is given to a patient with this condition, a tracheostomy is performed so that a patent airway can be maintained. Although adequate anesthesia can be obtained, this type of patient still presents many problems because of the inaccessibility of the teeth to be extracted.

The emotional status of the patient may determine the selection of anesthesia. Some people have a phobia regarding injections within the mouth. Because of the recent advances in general anesthesia, it is comparable in safety to local anesthesia. For this reason patients of this type are better managed under general anesthesia.

If the apprehensive patient must be treated under local anesthesia, sedation is necessary. The patient should receive a sedative at bedtime the night before surgery and again

1 hour prior to surgery. Intravenous sedation can be given at the time of surgery to augment sedatives already administered. Any patient who receives a sedative should be accompanied by a responsible adult. The surgeon is responsible for the patient while the latter is under the influence of the drug. Under no circumstances should a sedated patient be allowed to drive an automobile.

The nature of the procedure and the duration of time necessary to accomplish the exodontic procedure can govern the choice of anesthetic agent. In general, procedures requiring more than 30 minutes are better managed under local anesthesia with premedication or by admitting the patient to a hospital where adequate recovery facilities are available. With prolonged general anesthesia, a prolonged recovery time is necessary.

All patient should be questioned with regard to drug allergies. Patients having a possible history of allergy to local anesthetics should be questioned as to the type of reaction experienced and referred to an allergist for evaluation. Patients who have a history of allergic reaction to procaine often are not allergic to lidocaine because of the different chemical configuration of the drug. Although lidocaine has a low incidence of allergic reactions, reactions to this drug have been reported. Infrequently, adverse reactions to barbiturates are found. Most of these are not true allergic reactions but are failures of the patients to respond to the drug in the normal fashion. Nausea, vomiting, or changes in the psyche are common reactions. In any office in which drugs are administered, an emergency tray should be immediately available with the proper drugs necessary for treatment of allergic reactions. The treatment of these reactions will be described later in this chapter.

Removal of Teeth Under General Anesthesia

Organization and teamwork are essential when using general anesthesia. An efficient team is composed of three or four members: the surgeon, the anesthetist, the assistant, whose duty is to use the suction apparatus and retract tissues, and sometimes an instrument nurse whose duty is to pass instruments or wield the mallet if a chisel technique is used. Every member of the team must know the technique and anticipate the needs of the surgeon and the patient. Unnecessary acts should be avoided. Each motion should be smooth and purposeful.

All instruments that may be needed for a procedure should be available so that a member of the team does not have to break scrub to get an instrument. The instruments should be on a tray and always grouped in the same fashion, with the most frequently used instruments in the most accessible position.

For general anesthesia the patient may be supine or in a sitting position. Each position has its advantages.

The general anesthetics most frequently used are inhalation alone, barbiturates alone, barbiturates with oxygen and nitrous oxide, and barbiturates with oxygen and nitrous oxide in combination with a more potent agent such as halothane (Fluothane). In addition, a local anesthetic is sometimes administered for vasoconstriction and to decrease the amount of barbiturate used in lengthy procedures.

A mouth prop is inserted immediately prior to induction of the anesthesia. Two types of mouth props are used - either a solid rubber bite block or a ratchet-type prop. If the latter is used, it is inserted in a closed position, and the patient is instructed to close on the mouth

prop to hold it in position. After induction the mouth prop is adjusted to the degree of opening desired.

Immediately after induction a mouth pack is positioned. The pack is placed in such manner as to hold the tongue and soft tissues of the floor of the mouth anteriorly to maintain an airway. Care must be taken not to place the pack so far posteriorly that the oropharynx is stimulated. When an inhalation anesthesia is used, an airtight pack is more important so that anesthesia may be maintained by use of a nasal mask. Extra sponges may be added over the pack to absorb secretions and blood. With general anesthesia, more bleeding is experienced because of the lack of vasoconstrictive agents.

The surgical team should be ready to work as soon as the patient is anesthetized. One should not lose 2 or 3 precious minutes by not being prepared. The mouth prop is opened immediately and the mouth pack placed. The tooth is extracted and the socket compressed and covered with a gauze sponge. The mouth pack is removed and the mouth suctioned. The mouth prop is closed but left in place until the patient responds. The patient is transferred to a mobile chair or table and moved to a recovery room where he is watched carefully by an attendant.

During longer procedures a gauze sponge is placed over the mouth pack and changed as necessary. The assistant retracts and suctions in the most dependent portion of the mouth, not necessarily in a socket. A careful, efficient, unhurried technique is developed. Efficiency comes from precise instrumentation with few instrument changes. One should accomplish all that is to be done with a given instrument before the instrument is exchanged for another (for example, curet around all teeth that are to be extracted before picking up forceps). In multiple extractions the maxillary teeth are removed in one quadrant first, and the necessary alveoloplasty there is finished and sutured. A gauze sponge is then placed over this wound to help control hemorrhage. The mandibular teeth are removed in the opposing quadrant. After completion of surgery in this area, a new gauze sponge is placed over the wound before the mouth prop is shifted so that extractions can be done in the two remaining quadrants. Frequently, when a series of teeth are being extracted, as each posterior tooth is removed, the socket is covered with a sponge to help control hemorrhage while the next anterior tooth is removed.

A powerful suction apparatus is necessary. The greatest hazard when operating under general anesthesia comes from allowing blood, secretions, and debris to collect within the mouth. If these materials are allowed to descend, the larynx can be irritated and a laryngospasm caused, a lung abscess can be formed, or nausea and vomiting may follow entrance of these materials into the stomach. The average suction available in a dental unit is inadequate. Two types of suction tips should be available. A tonsillar suction tip is best adapted for handling a large volume of fluid efficiently, but it is too bulky to allow for suctioning within a socket. A neurosurgical suction tip will enter a small area. It is helpful to have two suction tips on the table in case debris clogs one of the tips.

The art of exodontics is never one of force. This is particularly true when operating on a patient under general anesthesia. Because of the loss of subjective symptoms in the patient, it becomes easy for the novice to apply great force with an exolever or to retract soft tissue carelessly. Meticulous surgery when using general anesthesia is important so that the postoperative healing will not be a painful experience for the patient.

Removal of Teeth in the Hospital

Hospitalization of patients for exodontic procedures should always be considered when medical management of the patient may be a problem or the postoperative course may necessitate special care.

Before a patient is admitted to a hospital, arrangements must be made with the admitting office so that a bed will be available. The operating room secretary is also called so that an operating room can be reserved for the procedure.

The dental staff of the hospital is obligated to observe the basic rules of the hospital and the American Hospital Association. Although it is not the object of this text to outline hospital procedure, some basic rules should be noted. A patient who will undergo general anesthesia must have a physical examination, which includes a history. All patients admitted to a hospital for more than 24 hours should have routine laboratory tests. These usually consist of a hematocrit (HCT), a white blood cell count (WBC), a differential white count, and a urinalysis. A chest radiograph and serological tests may be required by some hospitals. Patients older than 45 years of age often are examined by an electrocardiogram (ECG) if general anesthesia is to be used. The dentist must write the necessary orders and an admission note, which includes the reason for the admission and the contemplated procedure. A dental history and oral examination should also be included in the dentist's note.

The dentist should check with the operating room personnel to be sure that all instruments necessary for the procedure will be available. In many hospitals the dentist must provide certain instruments.

In the operating room, sterile precautions are employed. The surgeon is expected to scrub and to wear a cap, gown, mask, and gloves.

The area around the patient's mouth should be prepared with an antiseptic solution to remove surface contaminants. If a single extraction or a minor procedure is to be performed, the simple placement of sterile towels to isolate the mouth is all the draping necessary. For multiple extractions or more extensive procedures, sterile sheets should be added so that the entire patient is covered to guard against contamination.

On completion of surgery a description of the operative procedure is dictated so that it may be added to the patient's chart. This note should include the following: date; names of the patient, surgeon, assistant, and anesthetist; type of anesthesia and agents used; surgical procedure and how it was accomplished; any complications (such as extensive hemorrhage); and condition of the patient at completion of surgery.

New orders are written, since preoperative orders are usually cancelled by the operating room procedure. Orders suggested by the consulting physician have to be rewritten to be given. Routine postoperative orders include patient's ambulatory status (bed rest until recovered, then up and about), hot or cold applications for swelling, antibiotics if needed for infections, diet, and an order for an analgesic and a hypnotic, if needed. Daily progress notes are entered by the dentist.

At the time of the patient's discharge from the hospital, a discharge summary of one paragraph is written, including reason for admission, surgical procedure, post-surgical course, and condition on discharge.

Management of Acutely Infected Teeth

With the advent of antibiotics, the management of acutely infected teeth has changed. In the past it was necessary to treat the patient palliatively until the infection could be localized and drained and the tooth extracted. Today this sometimes long delay can be avoided by use of antibiotics. If the cause of the infection (that is, the tooth) can be removed, the resolution of the infection will be accelerated. The abscess formation may not have reached the stage at which tissue is broken down and pus formed. Antibiotics may control the acute infectious process, preventing pus formation. In any event, a blood level of antibiotics should be established as soon as possible. Once this blood level is established, the tooth should be removed if a surgical extraction is not deemed necessary. If a difficult extraction is anticipated, the patient should be placed on antibiotics until such time as a surgical flap can be raised and bone be removed without spreading the infection into surrounding tissues. The patient should remain on antibiotics after removal of an acutely infected tooth for 3 days after all evidence of the infection has disappeared.

Complications of Exodontics

Complications arise from errors in judgment, misuse of instruments, exertion of extreme force, and failure to obtain preoper visualization prior to acting. The old adage "To do good, you must see good" is apropos to exodontics, and one might add "Do well what you see".

Because of the anatomy of the maxillary antrum and its proximity to the maxillary premolar and molar roots, the antrum should always be considered when extracting teeth in this area.

Methods to remove maxillary roots are described in the section on root removal (Chapter 5).

Extreme force applied to upper molars can result in removal of the molar tooth along with the entire maxillary alveolar process and the floor of the antrum. The first, second, and third molars, along with the tuberosity, have been removed in one segment because of improper use of force in the maxilla. If during an extraction the surgeon feels large segments of bone moving with the tooth when pressure is applied, the forceps should be set aside and a flap raised. If judicious removal of part of the alveolar bone allows the tooth to be removed, then the remaining bone, which is attached to the periosteum, may be retained, and it will heal. This will minimize the bony defect. If the bone cannot be removed from the tooth, the mucosa should be incised and reflected so that the mucosa will not tear as the tooth and bone are removed. A laceration is much more difficult to repair than a well-planned incision.

Large antral perforations resulting from exodontics should be closed at the time of the extraction. The bone in the area should be smoothed with a rongeur or bone file. The mucoperiosteal flap is returned to position, and a watertight closure should be accomplished without putting undue pressure on the flap. If this cannot be done, the flap should be freed by means of an incision extending vertically into the mucobuccal fold and the mucosa of the flap undermined to allow it to advance over the defect.

When the antrum is entered during exodontics, the patient should be made aware of the situation and asked to not blow the nose and also to refrain if possible from coughing or

sneezing. Antibiotics and vasoconstrictive nose drops are prescribed to guard against infection of the sinus and to allow for emptying of the fluid that will collect within the sinus.

Occasionally, buccal roots of premolars and molares are pushed laterally through the wall of the maxilla and lie above the attachment of the buccinator muscle. When the operator uses root exolevers in this area, a finger of the left hand should be held against the buccal plate so that he or she can be aware of any movement of the root in this direction. If the root is dislodged into these tissues, a small incision is made in the mucosa inferior to the root tip and the root tip is removed with a small hemostat or similar instrument.

The infratemporal space lies directly posterior and superior to the tuberosity of the maxilla. Within this space lie many important neurovascular structures. In the elevation of third molars or third molar root tips and in the removal of supernumerary molars, care must be taken not to dislodge them posteriorly. If an object is to be removed from the infratemporal space, adequate visualization and careful dissection are necessary. The incision should include the entire tuberosity and extend posteriorly to the anterior pillar of the fauces. Blind dissection and groping for objects in this area can be complicated by massive hemorrhage or nerve damage.

In the third molar region of the mandible, the lingual surface of the mandible curves laterally, close to the apices of this tooth. Therefore it is not difficult to dislodge a root tip inferiorly into this space when the lingual plate is fractured. When a root tip is displaced in this area, a finger should be placed inferior to the root tip (in the mouth) to stabilize the tip against the lingual plate of the mandible. Access to this area is gained by making a mucoperiosteal flap on the lingual side of the mandible and extending anteriorly enough that the tissues can be retracted lingually for good vision.

Recovery of a root tip in the mandibular canal is principally a problem of access and vision. Usually it is difficult to remove bone overlying the canal from within the depths of the wound, which is usually the third molar socket. Access may be gained by removal of bone from the buccal plate and by careful removal of bone that overlies the canal. If one of the vascular components of the canal has been injured, it may be necessary to pack the socket with gauze, allowing 10 minutes for control of the hemorrhage. If hemorrhage cannot be controlled in this manner, the injured vessel should be severed completely and allowed to retract into the canal. At this time the socket is again packed, and hemorrhage control is usually accomplished.

Postexodontic Complications

Postoperative hemorrhage is the most common complication after exodontics. If the patient calls from home to report that hemorrhage has started again, he should be advised first to clear the mouth of any blood clots with a gauze sponge and then rinse the mouth with warm salt water. All excessive blood clots should be removed from the vicinity of the socket, but the clot in the socket should not be removed. The patient is instructed to bite firmly on a sterile gauze sponge that has been folded so that pressure is exerted on the area of surgery. If a sterile gauze sponge is not available, the patient may use a tea bag that has been placed in cold water to soften the tea leaves. The patient is advised to bite (not chew) on the pad or tea bag for 20 minutes. If bleeding persists at the end of this period, the patient should be seen by the dentist.

In cases of persistent hemorrhage, gauze sponges and hemostatic agents such as Gelfoam, topical thrombin, and oxidized cellulose may be helpful for the local control of hemorrhage in addition to an adequate armamentarium.

The patient is seated and a local anesthetic administered. The clot that has formed within the socket is removed. Next, the area of hemorrhage is located. If the hemorrhage is coming from a bone bleeder within the socket, the dull side of a curet is used to burnish the bone in the area of hemorrhage. If generalized bone bleeding is present, the socket is packed with a hemostatic agent such as Gelfoam soaked in thrombin, and a purse-string suture is applied to hold the hemostatic agent in place. The patient is asked to bite on a moist gauze sponge. If the hemorrhage is from the surrounding soft tissue, a tension suture is placed to apply pressure to the area (see Chapter 13).

In patients with advanced periodontal disease, postoperative bleeding will occur if granulation tissue is allowed to remain after removal of the affected teeth. At the time of surgery a few minutes spent removing the granulation tissue and suturing the alveolar mucosa will assure good hemorrhage control.

Infection can occur as a postoperative complication. Treatment of such infection is managed by using the principles outlined in Chapter 11.

Dry socket (localized osteitis) is one of the most perplexing postoperative complications. The etiology of the dry socket is unknown, but the following factors increase the incidence of this painful post-extraction sequela: trauma, infection, decreased vascular supply of the surrounding bone, and general systemic condition.

This condition rarely occurs when minimal traumatic methods are employed during difficult or simple extractions. Meticulous debridement of all extraction wounds should be done routinely. The etiology may be related to factors that impede or prevent adequate nourishment from reaching the newly formed blood clot within the alveolus. Patients with dense osteosclerotic bone or with teeth that have osteosclerotic alveolar walls because of chronic infection are predisposed to dry sockets.

Dry socket most commonly develops on the third or fourth postoperative day and is characterized by severe, continuous pain and necrotic odor. Clinically the condition may be described as an alveolus in which the primary blood clot has become necrotic and remains within the alveolus as a septic foreign body until it is removed by irrigation. This usually occurs a few days after extraction, leaving the alveolar walls divested of their protective covering. The denuded bone is accompanied by severe pain, which can be controlled only by local application of potent analgesics and oral or parenteral use of analgesics or narcotics.

To treat a septic alveolus properly, one must understand the physiology of bone repair. If the loss of the primary blood clot results from a sclerotic condition of the alveolar walls and the absence of nutrient vessels, then the resulting denuded bone surface must be viewed as any other denuded bone surface and the dentist must rely on nature's methods of bone repair for ultimate recovery and not employ any other methods that would disturb the healing process.

A septic alveolus is a denuded bone surface. Nature abhors denuded bone and responds to repair it. Behind this denuded and traumatized surface an immediate mechanism is set up to physiologically correct the defect. All denuded bone becomes necrotic and must be

removed before it can be replaced by normal bone. During this period the contiguous region behind the alveolus is defended against invasion of pyogenic organisms within the septic alveolus, provided nothing is done to break through or violate this wall until the repair mechanism is ready to replace the nonvital structure. This process usually takes 2 to 3 weeks, depending on the regenerative capacity of the individual.

With the completion of this cycle, the nonvital alveolar wall is sequestered molecularly or en masse, and immediately behind it is a defensive and regenerative layer of juvenile connective tissue that ultimately fills the void and undergoes osseous replacement. During this period, treatment should be directed only to maintenance of wound hygiene, with employment of antiseptic, analgesic dressings within the alveolus of sufficient potency to keep the patient comfortable. Nature must do the repairing. Curettage is contraindicated and will not only delay physiological healing and repair but may also permit invasion of infection into and beyond the area of defense immediately behind the denuded alveolus.

Prevention, of course, is the best treatment. To this end, atraumatic surgery, avoidance of contamination, and maintenance of a good level of general health are important.

When a dry socket does develop, treatment should be palliative. The socket is gently irrigated with warm normal saline solution to remove all debris. After the socket has been carefully dried, it is lightly dressed with 1/4-inch plain gauze saturated with an obtundent paste, such as equal parts of thymol iodide powder and benzocaine crystals dissolved in eugenol. The dressing may be changed as necessary until pain has subsided and granulation tissue has covered the walls of the socket.

Emergencies in the Dental Office

The number of emergencies that arise in a dental office is inversely proportional to the preventive measures taken by the dentist. A good medical history, carefully evaluated, may be the best insurance against office emergencies. Although dental emergencies are rare, the dentist and staff must be prepared to manage those that do arise. A well-organized plan of treatment should be worked out and rehearsed to cope with these situations. Emergency drills, just like fire drills, may save lives. Emergency situations can be of a minor or a major nature, but, in all instances, if improper care is given the outcome can be disastrous.

The dental office should be equipped with oxygen that can be applied under positive pressure. An emergency tray containing all the necessary drugs should be readily available and checked from time to time to ensure completeness. Drugs should never be taken from an emergency tray for routine use.

Syncope (fainting) is probably the most common emergency and is usually associated with the administration of a local anesthetic. The etiology is cerebral hypoxia, resulting from the disturbance of the normal mechanism of blood pressure control. Dilation of the splanchnic vessels causes a fall in blood pressure with a decrease in cerebral blood flow. The initiation of this reaction is of a psychic nature and should not be interpreted as a reaction to the drug administered. Symptoms include pallor, dizziness, light-headedness, clammy skin, nausea, and sometimes complete loss of consciousness. The treatment consists of placing the patient in a supine position, with the head lower than the rest of the body. An airway is maintained, and oxygen should be administered. Mild respiratory stimulants such as spirits of ammonia can be used, but analeptics and other more potent agents are generally not used

unless specifically indicated. Prevention of syncope can be accomplished by considering the psychic constitution of the patient. Measures should be taken to allay apprehension.

Toxic reactions to local anesthetics are characterized by an initial excitatory phase followed by marked depression. The patient may become talkative and anxious. Nausea and vomiting may occur. If the drug is given intravenously, the initial excitatory phase may be brief, terminating in convulsions followed by marked depression. (When administering a drug intravenously, always aspirate before injecting.) If any signs of reaction to the drug are noted during an injection, the needle should be withdrawn immediately.

Most reactions to local anesthesia are of a minor nature and can be treated palliatively. If convulsions occur and become increasingly intense, a short-acting barbiturate or diazepam should be given intravenously to control the convulsions. Oxygen should then be given to ensure adequate oxygenation. When the stimulatory phase is mild or of short duration, no sedative is given but oxygen is administered, and steps are taken to maintain adequate circulation.

In cases of severe central nervous system stimulation or depression or cardiovascular collapse, the dentist should initiate treatment but call for additional professional help. The calling of other professional personnel does not indicate inadequacy on the part of the dentist but instead shows good judgment.

To avoid allergic reactions to medication, the dentist should complete an adequate history and evaluation before using the drug.

Allergic reactions to drugs can vary from delayed reactions that are more annoying than dangerous to anaphylactoid reactions that are severe and often lead to the death of the patient. Most drugs at one time or another have been associated with allergic reactions. Penicillin, sulfonamides, and other antibiotics are the most common drugs the dentist may use that are associated with allergic reactions.

Delayed or less severe reactions may be characterized by swelling at the site of injection, angioneurotic edema, pruritus, and urticaria. Treatment consists of antihistamines and palliative care.

Anaphylactoid reactions develop quickly. The patient becomes extremely apprehensive, intensive itching occurs, and asthmatic breathing develops. Urticaria may develop rapidly; the blood pressure falls, and the pulse becomes weak or absent. The patient may lapse into an unconscious state with or without convulsions. Death may occur within a few minutes or several hours later.

Treatment of an anaphylactoid reaction consists of the immediate application of a tourniquet above the site of injection if possible.

Because of the vasopressor, bronchodilator, and antihistaminic effects of epinephrine, it is the drug of choice in reactions of this type. The dosage in the adult will range from 0.3 to 1 mg (0.3 to 1 mL of a 1:1,000 solution) subcutaneously or intramuscularly. In all severe systemic reactions, a cannulated vein allows for rapid use of drugs and fluid management. If possible, an intravenous route should be started and maintained. The intravenous route allows for titration or fractional doses of epinephrine, although the total dosage is approximately the same. Oxygen under pressure should be given with assisted respiration. Antihistamines, such

as diphenhydramine, 50 mg, are given intravenously or intramuscularly. Corticosteroids such as hydrocortisone (Solu-Cortef), 100 mg intravenously or intramuscularly, are usually recommended for their peripheral vascular effect.

Professional aid should be called as soon as possible to consult in the further treatment of the patient. If symptoms continue, consider readministration of epinephrine or antihistamine. If the blood pressure is low, consider the use of a vasopressor drug such as phenylephrine, 1 to 5 mg intramuscularly.

During exodontics, teeth are sometimes inadvertently displaced into the oropharynx, larynx, trachea, and esophagus. Teeth in these positions can present serious problems that could be avoided by simple precautions. A gauze screen should always be placed to block off the oropharynx from the mouth. This is true whether the exodontic procedure is performed under general or under local anesthesia.

Teeth displaced into the oropharynx present no problem, provided they can be retrieved before they descend into the deeper structures. When a tooth is displaced in the oropharynx while the patient is under local anesthesia, the patient is instructed to hold perfectly still and not swallow or take a breath until the tooth can be retrieved. If this occurs under general anesthesia, everything stops until the tooth is retrieved. The assistant should be cautioned not to move the retractor or suction tip because any movement may cause the loss of the tooth into the larynx or esophagus.

When a tooth is displaced in the posterior portion of the mouth, the natural reflex of the patient is to cough or swallow. In the majority of cases the patient will swallow, carrying the tooth into the esophagus. Regardless of the patient's reactions, radiographs should be taken to determine the exact location of the tooth. If the tooth is found to be in the gastrointestinal tract, a high bulk diet should be prescribed, and the patient should contact the dentist if any gastrointestinal symptoms occur. Usually the tooth will be passed without incident.

In coughing, the patient can either cough up the foreign body or it will be lodged in the larynx or aspirated into the tracheobronchial tree. The abdominal thrust procedure should be used to dislodge large objects from this area. In the case of teeth in the larynx, a laryngeal spasm may occur, blocking the exchange of air. The tooth may be removed by means of a laryngoscope and a Magill forceps. If the tooth cannot be removed quickly, an airway must be established. This can be accomplished by a cricothyroidotomy through the triangularly shaped cricothyroid membrane and into the trachea. The cricothyroid membrane is located between the thyroid cartilage (Adam's apple), which is the largest of the tracheal cartilages, and the cricoid cartilage, which is the next inferior tracheal cartilage. Oxygen then should be given through the established airway until the tooth is removed and the laryngeal spasm is broken.

Teeth that are aspirated into the tracheobronchial tree present a serious problem. The removal of teeth in this position can be accomplished only by someone trained in methods of bronchoscopy. The patient may cough spontaneously, and cyanosis may occur. Oxygen should be given until the patient can be transferred to an area where a radiograph of the chest and direct bronchoscopy can be accomplished. The aspiration of teeth and other debris during dental operations has been associated with a high incidence of lung abscesses.

Under all circumstances a radiograph of the chest and possibly of the abdomen must be taken to establish the exact location of any tooth that is displaced.