



Planning For Medical Emergencies In The Dental Office

Most dental visits and procedures unfold smoothly, but unfortunately medical emergencies sometimes occur, requiring the need for quick action. These emergencies include those related directly to the procedure, such as local anesthetic systemic toxicity, and those related to medical conditions, such as ventricular fibrillation triggered by a myocardial infarction (MI). Dentists unprepared for emergencies run the risk of not being able to care for patients correctly and effectively. This may result in patient harm, which can leave the dentist open to legal liability for malpractice.

Creating a plan for responding to medical emergencies, educating staff, and engaging in appropriate follow-up should an emergency occur can facilitate the delivery of optimal care and reduce legal risk.

Know expectations

Before developing the plan, dentists should consider if the states where they practice have any requirements related to emergencies. For example, an Illinois law requires dentists who administer deep sedation and general anesthesia to have an automated external defibrillator (AED) and a written medical emergency plan. Florida regulations state that for dentists providing deep sedation or general anesthesia, "A dentist and all assistant/dental hygienist personnel shall also be trained in the use of either an AED or a defibrillator and electrocardiograph as part of their cardiopulmonary resuscitation course at the basic life support level."

The best way to learn about state requirements is to check with the state dental association or dental board (www.ada.org/en/education-careers/licensure/licensure-dental-students/state-dental-boards).

Dentists should also consider that their actions will be judged against the standard of care provided by other dentists. According to the *2018 CDP Survey on Preparedness for Medical Emergencies in the Dental Practice*, nearly 97% of dental practices have a plan for responding to medical emergencies, so not having such a plan would deviate from standard care.

The American Dental Association (ADA) also addresses responsibilities during an emergency. For example, ADA's *Guidelines for the Use of Sedation and General Anesthesia* by Dentists notes that dentists should be able to diagnose and manage a patient who experiences a level of sedation deeper than intended, adding, "For all levels of sedation, the qualified dentist must have the training, skills, drugs and equipment to identify and manage such an occurrence until either assistance arrives (emergency medical service) or the patient returns to the intended level of sedation without airway or cardiovascular complications."

The national government has weighed in as well. The Occupational Safety and Health Administration (OSHA) requires employers with

11 or more employees to have a written emergency action plan. (Those with fewer than 11 can communicate the plan verbally, but for legal protection a written plan is preferred.) OSHA defines a workplace emergency as "an unforeseen situation that threatens your employees, customers, or the public," so medical emergencies would fall within those parameters.

Create the plan

The emergency action plan should consider the dental practice's typical patients. For example, a practice of primarily pediatric patients has different needs (such as medication dosages) than that composed primarily of geriatric patients. Several components should be included in the plan.

Team roles and communication. Most people want to help during an emergency, but if roles are not structured, communication can be poor, resulting in less-than-optimal care. Although the number of team members may vary by dental setting, here are the general roles.

- The team leader (dentist) directs the team members as what actions they should take. (Ideally, team leaders should not perform cardiopulmonary resuscitation [CPR] so they can concentrate on the plan.)
- A second team member (such as a dental assistant or hygienist) should be responsible to retrieving emergency equipment, including oxygen, an AED, and an emergency medication cart.
- A third team member (such as a dental assistant or hygienist) can document what is occurring and assist as needed, for example, by providing respiratory assistance using a bag-valve-mask device.
- The receptionist can call emergency services and ensure that on arrival, they are quickly escorted to the patient. (Be sure emergency numbers are prominently placed next to phones. In a stressful situation, someone might forget 911.)

The plan should include contingencies (what to do if a staff member is off sick or on vacation). It is also helpful to note how communication should occur among team members, which typically means ensuring that communication occurs in a closed loop. For example, the team leader might say, "Start oxygen at 60% by face mask," and the team member might say, "Oxygen 60% by face mask has been started." This helps avoid errors and ensure that desired actions are completed.

Emergency equipment. The plan should list what emergency equipment should be in the office and who is responsible for maintaining it (see Emergency equipment). Checking equipment function (for example, defibrillator testing) and expiration dates (for example, medications) should be documented in case there is any question after an emergency (such as in a lawsuit) about



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proper functioning of equipment and currency of medications administered.

Requirements. Requirements such as which staff must maintain current CPR training should be noted in the plan. There needs to be enough trained staff to cover vacations and illness.

Specific emergency types. It can be helpful to have strategies or algorithms that address common types of emergencies seen by dentists, such as syncope, acute asthma attack, hyperventilation, MI, seizures caused by epilepsy, diabetic emergencies (for example, hypoglycemia), allergic reactions (including local anesthesia emergencies), choking and aspiration, and cardiac arrest.

Educate staff

For an emergency action plan to be effective, staff must be prepared to implement it. Education ensures that staff understand their responsibilities. According to the *2018 CDP Survey on Preparedness for Medical Emergencies in the Dental Practice*, the most common types of training used are reviewing written materials (60%), live training by an outside presenter (58%), and a training exercise (53%).

Initial training on the plan should build in ample time for questions and hands-on practice with equipment such as AEDs and bag-valve-mask devices. This should be followed by quarterly updates. Unannounced emergency simulations are an excellent method for keeping skills sharp, and CPR training should be updated annually. Document all training in employee records.

Build skills

In addition to educating staff, dentists should ensure they have the skills needed to manage an emergency medical event. In addition to knowing proper response (for example, drug dosages) to various types of situations, dentists should ensure they are astute at recognizing early signs of patient distress such as respiratory hypo- or hyperventilation, chest discomfort, lightheadedness, and hypotension. Prompt action to manage mild or moderate symptoms can prevent more serious adverse effects. (See Initial steps in an emergency.)

Attending live or online continuing education programs offered by professional associations is helpful, as is reading journal articles. Another option is completion of the American Heart Association’s Advanced Cardiac Life Support training. Dentists should keep a record of courses attended to document their expertise.

In case of emergency

If an emergency occurs, staff should respond according to their assigned roles. One person should be assigned to document events, including CPR, medications administered (name, dose, and route), defibrillation (including setting), patient response (vital signs, rhythm), transport (where the patient was taken and by what route), and

notification of family members. Information needs to be detailed enough that someone can follow what happened even months after the event.

If the emergency was relatively minor (for example, a patient with diabetes who experiences mild hypoglycemia responds well to orange juice) and vital signs are normal, a patient may be permitted to return home. However, if there are any concerns, it is better to ensure the patient does not drive but rather is transported home by an adult. In the case of more serious events, the

EMERGENCY EQUIPMENT

Dentists should be knowledgeable of the regulatory requirements of their licensing agency (the State Board of Dentistry), which define the emergency equipment dentists are required to have in the dental office. These requirements likely include emergency equipment such as:

- **AED.** Be sure key staff know how to use the device.
- **Respiratory support devices.** A nasal cannula and face mask should be available for delivering oxygen, as should a bag-valve-mask device to use with patients who have ineffective or no respirations. An oropharyngeal airway is helpful for maintaining an open airway for patients unable to do so on their own.
- **Emergency medications.** Roberson (2012) and Rosenberg (2010) recommend the following emergency drugs:
 - Oxygen as supplemental adjunct
 - Epinephrine for anaphylaxis, bronchospasm
 - Diphenhydramine for allergic reactions, anaphylaxis
 - Albuterol (or another bronchodilator) for asthmatic attack, bronchospasm
 - Nitroglycerin for angina
 - Aspirin for suspected MI
 - Glucose source for hypoglycemia
 - Ammonia inhalants for syncope.
- **Monitoring equipment.** This includes a sphygmomanometer with adult small, medium, and large cuff sizes and pediatric cuffs if needed, along with a stethoscope, glucometer, and pulse oximeter.
- **Ancillary equipment.** Magill forceps can be used to retrieve foreign objects that fall and block the airway during a dental procedure. Dentists performing deep sedation and general anesthesia should also consider a suction setup, intravenous supplies, and endotracheal equipment.

It is best to store all emergency equipment on a cart so it can be easily transported to the treatment area.

dentist should have emergency medical system responders transport the patient to the hospital, even if the immediate danger has passed. The dentist should provide detailed information to responders about the patient’s condition and how it was treated. The method of discharge or transport should be documented in the patient’s dental record. With the patient’s permission, the dentist should also report the incident to the patient’s primary care provider.

INITIAL STEPS IN AN EMERGENCY

Here are the first steps dentists should take if an emergency occurs:

- Stop treatment.
- Position the patient depending on the nature of the emergency (for example, supine if CPR is needed or upright if respiratory distress is the issue).
- Check responsiveness and, if needed, instruct a staff member to call 911.
- Ask a staff member to retrieve an AED.
- Assess ABCs: airway, breathing, circulation.
- Provide support until emergency medical services arrive.

An important last step is to debrief with staff as to what went well and identify areas for improvement.

Prevention

An emergency action plan is essential for the dental office, but it is also important to take steps to prevent emergencies from occurring. Dentists should conduct a thorough assessment of patients to identify those who might be at higher risk for adverse effects from procedures.

This assessment should begin with a thorough history that detects past conditions (for example, a history of MI) and current comorbidities (for example, hypertension) that could increase

risk. Dentists also should ask about allergies and medications. The history should be followed by a physical exam that includes vital signs. The combined findings from the history and physical can help determine if the patient has any outstanding health issues that need to be addressed before a procedure and if comorbidities are being well managed.

The information obtained also can be used to determine risk and guide decision-making. Dentists can use the American Society of Anesthesiologists Physical Classification System to determine anesthesia risk (www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system). For those at higher risk, dentists can consult with the patient's medical provider before the procedure to determine if any special precautions are needed. Dentists may also choose to adjust the amount or type of anesthesia used and work to ensure that the procedure is completed quickly. Finally, in some cases it may be necessary to refer patients to a provider more experienced in treating high risk patients or a hospital-based dental facility.

Be prepared

Dentists are committed to delivering the best possible care to their patients. An emergency action plan is essential for meeting that commitment and for protecting the dentist from legal action should an emergency occur.

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Dental Expressions® – From the CNA Claim Files

This claim case involves a medical emergency associated with the administration of local anesthetic. Millions of local anesthetic doses are safely administered in dental offices every year. However, dentists must remain vigilant and remember that all medications present risks as well as benefits.

Claim Case Study

Practitioner: General dentist

Claimant: 5-year old, 36-pound female

Risk management topics: Medical history; patient assessment; local anesthetic dosage; medical emergency protocol

Facts: The child-patient and mother arrived at the dental office for a new patient visit. After completion of a medical/dental history and other required registration forms, the dental hygienist introduced herself and proceeded to seat the patient. The

hygienist noted that many of the patient's teeth exhibited dental decay with the exception of the maxillary and mandibular incisors. Mandibular posterior teeth were the most severely decayed: two teeth were decayed to the gum line.

A dental assistant tried to engage the patient in conversation while waiting for the doctor's exam. However, the patient remained quiet and essentially non-responsive.

The dentist's examination confirmed the extent of dental decay, and he also noticed that the patient was unusually quiet, even lethargic. The hygienist summarized the medical history for the doctor. She advised the dentist that when asked about the patient's behavior, the mother replied that she was acting normally.

The dentist proposed restoring a number of the teeth that same day. Some teeth would require pulpotomies and stainless steel crowns.

The dental assistant began administering nitrous oxide via mask, which was estimated to have been used for a total of 10 minutes. The dentist, who had briefly left the room, returned and noticed the patient's movements seemed unusual. The dentist examined the medical history form: there seemed to be no significant medical conditions or concerns. The doctor then spoke directly to the patient and explained the next steps to restore her teeth: the patient seemed to understand but remained silent.

The dentist stated that he administered lidocaine 2% with epinephrine 1:100,000 for local anesthesia: 1.5 cartridges for the lower right quadrant; another 1.5 cartridges in the upper right quadrant, and 1/2 of a cartridge to anesthetize the buccal and lingual gingival. Although this was reflected in the dental healthcare information record following the procedure, the cartridges were disposed of and not available for confirmation. Staff members were unable to confirm the volume of anesthetic or number of cartridges administered. If accurately recorded, the drug administered was from 3.5 to 4 cartridges, for a total dose of 126 to 144 mg.

The decay excavation resulted in a carious exposure of tooth 5, followed by a pulpotomy. While the temporary cement was being mixed, the patient wheezed, then went limp after two labored breaths. The dentist checked responsiveness and proceeded to assess the patient's breathing and heart rate. When none were found, the dentist directed a staff person to call 911.

The dentist initiated CPR, handling rescue breathing while the dental assistant carried out compressions. The assistant became concerned that she might be injuring the patient's ribs: the dentist then began to administer one-person CPR. Breaths appeared to be ineffective initially. After re-positioning several times, breath finally went into the patient's lungs, resulting in gurgling sounds. The patient was turned to the side in an attempt to initiate a cough or drain fluid from the patient's lungs: this maneuver was not successful.

CPR continued until the paramedics arrived, approximately five minutes after initiating the emergency medical system. The paramedics continued CPR for approximately five minutes and then transported the patient to the children's hospital emergency room. The patient was intubated and mechanically ventilated, but had no pulse. Administration of epinephrine and atropine resulted in a return of sinus rhythm and her blood pressure stabilized.

The patient returned to consciousness in the pediatric intensive care unit. The patient recovered physically, though the anoxic event was believed to have caused some level of irreversible brain damage.

Key Allegations: Negligent administration of lidocaine; negligent administration of nitrous oxide; failure to properly monitor the patient's condition, resulting in cardiac arrest; failure to provide prompt and proper emergency resuscitation.

Alleged Injury/Damages: Permanent brain injury (demand in excess of policy limits) .

Analysis: The medical analysis concluded that the patient suffered "acute lidocaine toxicity" as a result of being anesthetized for severe

dental caries. No separate, underlying circulatory or respiratory conditions were reported in the patient history and none were found in the course of the investigation.

The maximum recommended pediatric dose of lidocaine with epinephrine may vary, depending upon the source. For example, the [American Academy of Pediatric Dentistry](#) recommends 4.4 mg/kg of body weight, while the [FDA prescribing information](#) states a maximum dosage for this patient is approximately 72 to 115 mg of lidocaine, or the contents of about 2 to 3.2 dental anesthetic cartridges.

Two defense experts reviewed the case: a pediatric dentist and a former medical staff chief/pediatrician. Given the facts of the case, the experts were not able to support the dentist's actions.

The dentist strongly believed the patient suffered from an unknown (or undisclosed) medical condition. He emphasized the unusual behavior he and the hygienist noted during the dental visit. This belief was not supported by the medical history or findings. Moreover, concerns about a possible unknown/significant medical condition would lead a prudent dentist to delay operative treatment. While the patient had severe decay, there were no signs of infection/abscess, and the patient did not complain of pain.

The defense would face other potential challenges in this case:

- Failure to perform CPR correctly.
- While an emergency medical kit was available, no medications were accessed or administered until the patient was transported by EMS.
- The dentist also was criticized for not having an Ambu® bag or automatic external defibrillator (AED) in the office. According to the American Heart Association, a standard AED can be used with children from 1 to 8 years of age with pediatric attenuated pads.
- Limited documentation in the dental healthcare information record was present. The record reflected no examination charting; no dental radiographs; and no documented informed consent discussion or written form.
- Finally, there were concerns regarding the actual dose administered, as noted previously.

Outcome: Costs associated with this claim were in the high six-figures. A subsequent state board investigation led to license suspension, with re-assessment after completion of a required remediation program.

Medical emergencies in the dental office are relatively rare, but incidents may result in significant or permanent injuries. Preparation, training and conducting practice scenarios are important to effective emergency response procedures.

This case highlights the importance of understanding LA maximum dosages and calculating the limit, when appropriate, especially with minor patients, frail/slightly-built adults, and those patients who present a higher risk due to co-morbid conditions or potential drug interactions. The best advice is to always use the lowest dose necessary to provide effective anesthesia.

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