

Quality Resource Guide

Seventh Edition

Medical Emergencies: Preparation and Management

Author Acknowledgements

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Educational Objectives

Following this unit of instruction, the practitioner should be able to:

1. List the most common medical emergencies occurring in the dental setting.
2. List the four components in preparation of the dental office and staff to promptly and effectively recognize and manage medical emergencies.
3. Describe the dental office emergency team, outlining the job requirements for each member.
4. Discuss when to call for emergency assistance and whom to call.
5. List the two injectable drugs in the basic emergency kit and describe their clinical indications.
6. List the six non-injectable drugs in the basic emergency kit and describe their clinical indications.
7. List the recommended emergency equipment.
8. Describe the algorithm for the management of all medical emergencies.
9. List the three components of 'D' – definitive care.

MetLife designates this activity for **1.0 continuing education credits** for the review of this Quality Resource Guide and successful completion of the post test.

The following commentary highlights fundamental and commonly accepted practices on the subject matter. The information is intended as a general overview and is for educational purposes only. This information does not constitute legal advice, which can only be provided by an attorney.

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Introduction

Preventable medical emergencies can and do happen in the practice of dentistry. Surveys of dentists in many countries demonstrate that, though rare, potentially life-threatening situations can be expected to occur in the dental office once every 2 to 4 years.¹⁻⁸ **Table 1** lists the most common emergencies from a survey of 4,309 dentists practicing in North America.⁸ **Table 2** lists the incidence of medical emergencies in an American Dental Association survey (N=529) of dental offices in the 12 months prior to March, 2018.⁹

Dental offices must be prepared to promptly recognize and effectively manage medical emergencies. Though no 'national standard' for emergency preparation exists in the USA, specialty groups, such as the American Association of Oral and Maxillofacial Surgeons,¹⁰ the American Academy of Pediatric Dentistry,¹¹ and the American Association of Periodontists¹² have developed guidelines for their membership. The states of Massachusetts¹³ and West Virginia¹⁴ require all dentists practicing in the state to maintain a 'minimal' kit of emergency drugs and equipment in their office.

Definition: A medical emergency in the dental office environment may be defined as an event occurring to the patient in the chair (or someone elsewhere in the dental office) that causes the doctor to stop 'doing' dentistry because they (the doctor) are now more concerned with the patient's life than with the patient's teeth.

Obligation: It is the obligation of the Healthcare Provider to the 'victim' of the medical emergency to try to keep the victim alive until (1) they recover or (2) help arrives on scene to take over management, provided that they are better qualified to handle the situation.

Prevention

Prevention of a medical emergency is more desirable than managing it once it occurs. Approximately 75% of medical emergencies are preventable. Thorough evaluation of the medical history, recording vital signs, assessment of medical risk (ASA classification), and use of treatment modifications, as needed, can prevent 'stress-induced' emergencies.

Table 3 lists other Quality Resource Guides discussing dental management of higher-risk patients.

Preparation

Preparation of the dental office and staff to recognize and manage medical emergencies is essential to a successful outcome. **Table 4** is an example for an office preparation plan listing the components involved in adequate preparation. Each dental office should develop their own detailed and specific plan fitting their circumstances.

1. Basic Life Support

Without doubt, basic life support (BLS) represents **THE** single most important element in the successful management of any medical emergency. Though not all state dental boards mandate BLS (also known as 'CPR') to maintain dental licensure, the Information for Use (IFU) that is packaged with all local anesthetic drugs states:¹⁵ "Dental practitioners and/or clinicians who employ local anesthetic agents should be well versed in diagnosis and management of emergencies that may arise from their use. Resuscitative equipment, oxygen, and other resuscitative drugs should be available for immediate use."

The availability of resuscitative equipment has been interpreted in courts as essential for one's ability to perform BLS. Repetitive training in the use of all resuscitative equipment is essential for proper utilization.

BLS Healthcare Provider (BLS-HCP) is the minimum level of training required. Though states mandating current BLS cards for dental licensure require successfully completing a course every two years, multiple studies have demonstrated a significant decrease in technical prowess in as little as six months.¹⁶⁻¹⁹ It is strongly suggested that BLS-HCP retraining be done at least annually.

Where BLS is mandated, it is often required only of the doctor, perhaps the dental hygienist, and, more rarely, the dental assistant. From a practical perspective, emergencies can happen to anyone, anytime, and anywhere. In the surveys cited above,¹⁻⁹ a number of medical emergencies developed in dental office personnel, including

Table 1 - Reported Medical Emergencies

Situation	# Reported
Synope	15,407
Mild allergic reaction	2,583
Angina pectoris	2,552
Postural hypotension	2,475
Seizures	1,595
Asthmatic attack (bronchospasm)	1,392
Hyperventilation	1,326
Epinephrine reaction	913
Insulin shock (hypoglycemia)	890
Cardiac arrest	331
Anaphylactic reaction	304
Myocardial infarction	289
Local anesthetic overdose	204

Table 2 - Incidence of Medical Emergencies within previous 12 months⁵ (N=529)

Emergency Situation	% Reporting
Synope	37.77
Epinephrine reaction	37.43
Postural hypotension	33.92
Mild/moderate allergic reaction	15.79
Physical injury requiring first aid	15.20
Hyperventilation	11.70
Seizure	11.11
Other, please specify	5.85
Insulin shock (hypoglycemia)	2.92
Asthmatic attack (bronchospasm)	1.75
Local anesthetic overdose	1.17
Angina pectoris	1.17
Anaphylactic reaction	0.58
Cardiac arrest	0.58

Table 3 - Recommended Quality Resource Guides

<i>Alternatives to Opioid Analgesics in Dental Practice</i> (5th Edition) - Arthur H. Jeske, DMD PhD
<i>Antibiotic Use in Dentistry</i> (4th Edition) - Arthur H. Jeske, DMD, PhD
<i>Contemporary Approaches to Antibiotic Prophylaxis in Dental Practice</i> (3rd edition) – Thomas P. Sollecito, DMD, FDS RCSEd, Eric T. Stoopler, DMD, FDSRCS, FDSRCPS
<i>Contemporary Local Anesthetics in Dental Practice</i> (2nd Edition) - Stanley F. Malamed, DDS
<i>Dental Care for Patients with Bleeding Disorders</i> (5th Edition) - Michael A. Huber, DDS
<i>Dental Care for Pregnant and Nursing Patients</i> (4th Edition) - Michael A. Huber, DDS
<i>Management of the Anxious, Fearful or Phobic Dental Patient</i> - Jennifer Farrell, DDS DASCD
<i>Medical Health History in Dental Practice</i> (7th Edition) - Bernadette Alvear Fa, DDS CPT
<i>Screening and Monitoring Blood Pressure in Dental Practice</i> (4th Edition) - Vidya Sankar, DMD, MHS

Table 4 - Preparation of the Dental Office and Staff for Medical Emergencies

BASIC LIFE SUPPORT

- Annually, taken IN the dental office
- BLS for Healthcare Providers and for ALL dental office employees
- Trained to ventilate mouth-to-mask, NOT mouth-to-mouth

DENTAL OFFICE EMERGENCY TEAM**Member #1**

First on scene of emergency
Stay with victim; yell for “HELP”
Administer BLS, as needed

Member #2

On hearing call for “HELP” obtains and brings to site of emergency:
(1) Emergency drug kit
(2) Portable O₂ cylinder
(3) AED

Member #3, #4 and on...

Assigned ancillary tasks such as:

- Monitoring vital signs (BP, heart rate and rhythm)
- Assist with BLS
- Activate EMS (Emergency Medical Services/9.1.1)
- Keep elevator available in lobby while awaiting arrival of EMS
- Prepare emergency drugs for administration
- Keep written timeline record during emergency

ACTIVATION OF EMS

When: As soon as YOU, the doctor, think it is necessary. For example: (1) unable to make a diagnosis; (2) know the diagnosis but are uncomfortable with it (e.g., cardiac arrest); and (3) whenever YOU think EMS is warranted.

DO NOT HESITATE TO ACTIVATE EMS, if you feel it is needed.

Whom to call: 911, and a nearby physician or dentist IF you know beforehand that they are well trained in the management of emergency situations.

EMERGENCY DRUGS AND EQUIPMENT

See Attachment 1

the doctor. Realistically, BLS-HCP training should be included in the job description of all dental office personnel.

As we are preparing ourselves to manage emergency situations in the dental office, it is strongly suggested that BLS-HCP courses be taken **IN YOUR DENTAL OFFICE** placing the mannequin in real-life situations, such as in the dental chair and on the floor in the reception room.

All staff members should be trained to ventilate using a mask. 'B' [breathing] in BLS has always been the step rescuers are most reluctant to perform, especially when the victim is a stranger. Regurgitation (passive vomiting) commonly occurs in the unconscious victim. Additionally, if the victim is undergoing dental treatment, it is likely their mouth will contain blood, pus, or other debris associated with that treatment. The ability to ventilate with a mask (barrier device) enables the rescuer to deliver oxygen to the victim (1) mouth-to-mask [16% O₂]; (2) bag-valve mask device [21% O₂]; or (3) with positive pressure O₂ [100% O₂] (though positive pressure O₂ is no longer recommended due to the very real risk of overventilation of the victim which promotes regurgitation).

Chest compression, if needed, CAN be effectively performed with the victim still in the dental chair. Lepere²⁰ demonstrated, and others have confirmed,²¹⁻²³ that the conventional dental chair provides firm support for the spinal cord, enabling sufficient blood volume to be circulated during chest compression.

Training in the use of the automated external defibrillator (AED) is an essential component of the BLS-HCP course. When available in a dental office – as it should be in all dental offices – its use should be reviewed periodically by all staff members. Lay-person BLS has, in certain specific instances, been modified so as to eliminate ventilation. Compression-only CPR is taught in these situations. It is important to remember that as Healthcare Providers the dental office staff is **STILL OBLIGATED TO BE ABLE TO VENTILATE AN APNEIC VICTIM.**

2. Dental Office Emergency Team

When an emergency arises, all office personnel should be able to respond rapidly and efficiently. This mandates the existence of a predetermined plan describing each person's function. A simple plan is described:

Member #1 is the first person at the scene of the emergency. When the situation develops in the dental chair this might be the doctor, hygienist or assistant. Where the situation occurs in the reception area it is the 'front office' people who will respond first. The earlier recommendation that all office personnel be BLS-HCP trained.

Member #1 (1) remains with the victim; (2) administers BLS, as needed; and (3) activates the dental office emergency team (e.g., Yells for help!).

Member #2 is assigned to immediately 'bring the stuff' to the site of the emergency. The oxygen cylinder, emergency drug kit, and AED are kept together in an easily accessible location (e.g., near a telephone).

Member #3 is, in fact, all the remaining members of the office staff. Possible duties include: activation of EMS; waiting outside for arrival of EMS and escorting them into the office; 'holding' the elevator in the lobby for EMS; monitoring vital signs; preparing emergency drugs for administration;

keeping a written record of the event, including a time line and treatment (e.g., 10:15 AM – EMS called; 10:21 EMS arrives in dental office); and assisting in BLS.

The dentist remains the team leader, the person legally responsible for the health and safety of the patient (e.g., victim). Tasks may be delegated as long as the person performing the task is capable of doing it well under the dentist's supervision.

3. Tactical breathing²⁴⁻²⁶

Thankfully, medical emergencies are relatively rare occurrences in the dental office environment, so it is not unreasonable to expect that the doctor and his/her staff will experience heightened emotions at this time. Tactical breathing, also known as "box breathing," is a technique used by First Responders that uses structured and paced inhalations, exhalations, and pauses, to improve an individual's stress response during and after stressful situations. In stressful situations the "fight or flight" response kicks in, speeding up breathing, dilating pupils, tensing muscles and flushing the skin. This sympathetic nervous system (SNS) response can be overwhelming, and in an emergency situation, can limit one's ability to respond or help effectively. Tactical breathing keeps an individual's breathing pattern from accelerating, minimizing the SNS response, and helps healthcare professionals effectively navigate crises. The technique is presented in **Table 5**.

Table 5 - Tactical Breathing²⁴

1. **Controlled exhale:** Put your right hand on your stomach and push the air out of your chest through your nostrils. This process should take you to the count of four.
2. **Hold:** Once your lungs are empty, wait for another count of four. Do your best to relax and concentrate on the sensations in your empty lungs or the rest of your body
3. **Controlled inhale:** Starting at the base of your stomach and moving up your chest, breathe in through your nose. Like the other two steps, this phase should take a full four seconds. Don't rush it. The point is to keep the airflow as smooth and consistent as possible.
4. **Hold:** It should be easier to hold for a count of four with air in your lungs versus empty, so staying relaxed during step four should be easier too.
5. **Repeat:** It's usually good to perform this breathing pattern for about five minutes, but you can extend it if you have the time

4. Summoning Assistance

Two questions: When? and Whom?

When to call for help: Emergency medical assistance should be sought as soon as the doctor (the person legally responsible for the patient) feels it is needed. This occurs (1) if diagnosis of the problem remains unknown; (2) when the diagnosis is known but is disturbing to the doctor; and (3) at any time the doctor feels uncomfortable and wishes help.

Never hesitate to seek assistance in managing a medical emergency if you feel it is warranted.

Whom to call: Emergency Medical Services (EMS) are the first responders to life-threatening medical emergencies in your community. In all areas of North America, 911 is the EMS number. EMS response times vary significantly from community to community. In almost all situations, EMS arrival will occur within ten minutes.^{27,28} Where response time is prolonged (e.g., traffic or rural environment²⁹) and the dental office is located in a 'medical-dental' complex there may be available another healthcare professional well-trained in emergency management. It is this author's opinion that the Oral and Maxillofacial Surgeon or Dentist Anesthesiologist commonly meet that standard as they are almost always trained in Advanced Cardiac Life Support and general anesthesia.

Mell and colleagues noted that in EMS units averaged 7 minutes from the time of a 911 call to arrival on scene. That median time increased to more than 14 minutes in rural settings, with nearly 1 of 4 encounters waiting almost half an hour for the arrival of EMS personnel.²⁸

Once EMS personnel arrive at the site of the emergency, they will take over its management. The primary duties of EMS personnel are to (1) save the victim's life, (2) stabilize the victim's condition at the scene, and (3) transport the victim to the emergency department of a hospital for definitive care, if necessary.

5. Emergency Drugs and Equipment.

(Attachment 1) Many, if not most, dentists admit they would be uncomfortable administering drugs (other than oxygen) during a medical emergency. Given, however, that the availability of emergency drugs is mandated (see IFU for local anesthetic drugs), it seems prudent to prepare an emergency drug kit consisting of drugs that are considered to be essential. Dentists should continue to seek continuing education to upgrade their knowledge and ability to safely and successfully employ emergency drugs.

The following drugs represent the 'bare bones basic' emergency kit. It contains eight drugs: two injectable and six non-injectable.

Injectable drugs: **Epinephrine** 1:1,000 for patients weighing more than 30 kg (66 pounds) and/or 1:2,000 for patients weighing 15 kg to 30 kg (33 to 66 pounds) in a preloaded auto-injector syringe represents the most important drug in the emergency kit and, fortunately, probably the least likely to be used. The availability of two preloaded auto-injector epinephrine syringes is recommended. A histamine-blocker, such as **diphenhydramine HCl** (Benadryl®), 50 mg/mL, is the other injectable drug. It is recommended that the emergency kit contain 2 or 3 1-mL ampules of diphenhydramine.

Both injectable drugs are used in the management of allergic reactions, be they non-life-threatening (diphenhydramine) or life-threatening (anaphylaxis – epinephrine and diphenhydramine).

Non-injectable drugs: **Oxygen** (available in an "E" cylinder) can be administered during almost any emergency situation. An 'E' cylinder provides O₂ for approximately 30 minutes during ventilation of an unconscious, apneic adult. **Nitroglycerin**, a vasodilator, is used to manage the acute anginal episode. Recommended for the dental office is either the translingual spray (Nitrolingual Pumpspray®) or sublingual tablets (NitroStat®). The tablets are considerably less expensive than the spray and are therefore more commonly used in the management of anginal episodes.

However, a bottle of nitroglycerin sublingual tablets, once opened, should be discarded after eight weeks. Tablets kept in a pill box and carried by the patient will deteriorate in a week.^{29,30}

Albuterol is the preferred bronchodilator used to manage bronchospasm (acute asthmatic episode). Hypoglycemia (low blood sugar) is a common occurrence in dentistry. An antihypoglycemic, a source of sugar such as a tube of a **glucose gel** should be included in the emergency drug kit. Alternatively, 12-ounces of orange juice or soft drink (non-diet) can be used.

Aspirin, tablet or chewable, is recommended in the prehospital management of 'suspected myocardial infarction' victims. A dose of 325 mg, chewed and swallowed with water, is administered as soon as one suspects a myocardial infarction might be occurring. Aspirin inhibits platelet aggregation, thus minimizing the size of the blood clot developing during a 'heart attack.' The narcotic antagonist, **naloxone**, has been added to the basic emergency drug kit in response to the nationwide opioid epidemic.³¹ Narcan® is administered as a nasal spray or by injection.

Equipment: **Oxygen delivery system**, preferably a bag-valve-mask device with several sized face masks (pediatric, small- and large-adult). Also recommended is a pocket mask to aid in mouth-to-mask ventilation. An **automated external defibrillator (AED)** is an absolutely essential part of emergency preparedness kit, as early defibrillation is **THE** most important intervention in successful resuscitation from cardiac arrest. Other equipment includes syringes and needles for drug administration; suction and suction tips; tourniquets; and Magill intubation forceps (for easy retrieval of foreign objects from the posterior part of the oral cavity or the pharynx).

Recognition & Management

Prompt recognition and efficient management of a medical emergency are essential to a successful outcome.

Recognize the presence of a problem, discontinue dental treatment, and institute emergency management as soon as the problem is noted.

Take a breath. Employ tactical breathing to help calm yourself and be better able to assess and manage the situation confronting you. (Table 5)

Recognition is based upon presenting signs and symptoms (S&S), including altered consciousness, respiratory distress, and chest pain. Whenever a patient reports any unusual S&S, immediately stop the dental procedure and seek to determine the cause of the situation and to manage it as efficaciously as possible.

The following algorithm represents the management sequence for all emergency situations except adult cardiac arrest: **P→A→B→C→D**.^{32,33}

In an adult cardiac arrest, 'C' — circulation, is deemed to be the greatest priority: **P→C→A→B→D**. The American Heart Association guidelines were updated in October 2025.³³ (Figure 1).

Position the patient appropriately.

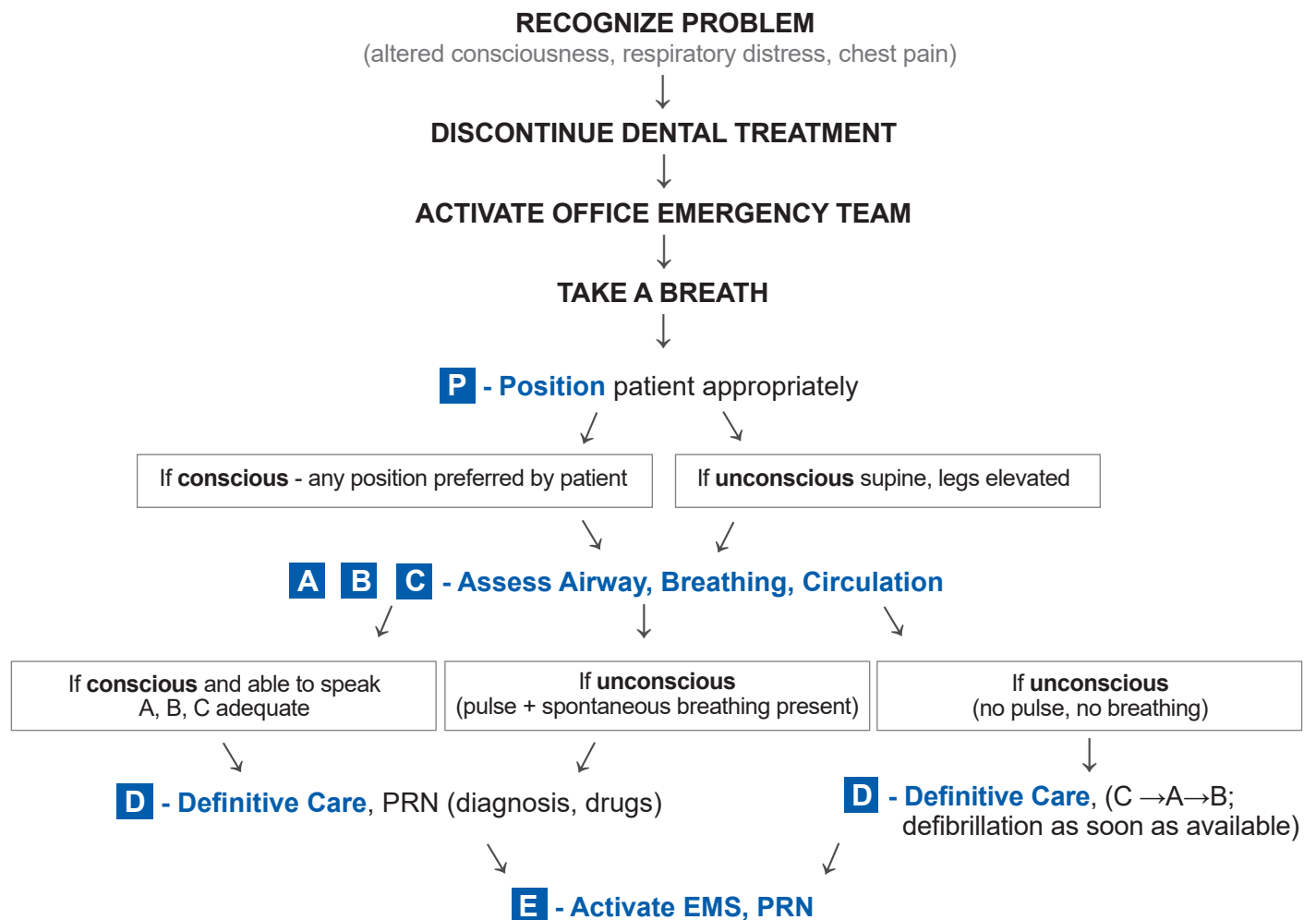
If conscious (e.g., speaking, moving), the position of choice is whatever is most comfortable for them. Unconsciousness is defined as the lack of response to sensory stimulation (e.g., verbal or physical stimulation). A decrease in blood flow to the brain (e.g., low blood pressure) is, far and away, the most common cause of unconsciousness.

All unconscious patients are placed, at least initially, into the supine position with their legs elevated slightly. The contemporary contoured dental chair is more than adequate. When the back of the dental chair is positioned parallel to the floor, the feet will be slightly elevated, enabling the return of blood from the legs back to the heart and the brain.

Airway, Breathing, and Circulation.

A, B and C are assessed and implemented as needed. In the conscious victim who is able to speak, A, B, and C are deemed to be 'adequate' (by virtue of the patient being conscious and capable of

Figure 1 - Algorithm for Managing Medical Emergencies



O₂-oxygen; P-position; A-airway; B-breathing; C-circulation; D-definitive care; PRN-as needed; EMS-Emergency Medical Services

speaking). With loss of consciousness, each step must be assessed individually. First, the airway (A) is assessed. In most unconscious persons, the head-tilt chin-lift provides a patent airway. However, airway patency must still be assessed using the 'look', 'listen', and 'feel' technique (B) with two rescue breaths (e.g., mouth-to-mask; bag-valve-mask) delivered in the absence of spontaneous respiratory efforts (e.g., apnea). C – the carotid pulse is palpated – for not more than 10 seconds, and if absent, or if doubt exists as to its presence (e.g., cardiac arrest), chest compressions are begun – 30 chest compressions followed by 2 ventilations. Four to five complete sequences are provided in approximately 2 minutes.^{32,33}

The goal of the steps (P→A→B→C) described thus far is to ensure that the victim's brain and heart are receiving an adequate supply of blood containing oxygen and 'sugar', the fuels required by the cells of the body to maintain normal function.

Definitive care.

Definitive care represents the final step of management. Possible components of definitive care include: **D**agnosis, **D**rugs and **D**efibrillation. When possible, a diagnosis has been made and treatment proceeds accordingly (examples of easily diagnosed problems include asthma, hypoglycemia, and angina).

Drugs, other than oxygen (which may be administered in any emergency situation), are rarely needed. Notable exceptions are acute bronchospasm (asthma) and the acute anginal episode. In both cases the patient (who arrives in the office with a pre-existing history of asthma or angina) will (1) diagnose their problem; (2) have their own bronchodilator or vasodilator (e.g., nitroglycerin) available; (3) be able to medicate themselves and (4) tell the doctor when they require additional emergency assistance (EMS). In the highly unlikely event of cardiac arrest, prompt defibrillation is critical.

It is important to note that the ammonia vaporole, commonly used in the past for the management of syncope is **no longer recommended**.³⁴ The acrid smell of ammonia has been observed to trigger bronchospasm as well as irritation to the upper respiratory tract, lung irritation resulting in coughing and, in some cases, nausea, retching, and vomiting.³⁵

Emergency medical services (EMS) should be summoned at any time it is deemed necessary.

The management of specific medical emergencies is summarized in **Attachment 2**. For more in-depth discussion of this subject, the interested reader is referred to textbooks such as *Handbook of Medical Emergencies in the Dental Office*.³⁶

Conclusion

The legal obligation of the dentist managing a medical emergency is to "try to keep the victim alive until (1) they recover or (2) someone, better trained in emergency care, takes over management of the victim."

The ultimate goal for a dentist managing a medical emergency is to prevent the death of the victim, a goal achieved through office preparation, prompt recognition, and effective management. In the most common dental office emergency, syncope (e.g., 'fainting'), simply instituting the steps of BLS (P → A → B → C) leads to the prompt recovery of consciousness. Drugs are NEVER the first line of management (except in anaphylaxis – an event highly unlikely to develop within the dental office environment). The management sequence introduced in the algorithm is to be adhered to in ALL emergency situations.

A superb, free, on-line resource is available to aid in the prevention, recognition and management of medical emergencies occurring in the dental office: "*Ten Minutes Saves a Life*" (from the Anesthesia Research Foundation) www.adsa-arf.org. It is also available from both the AppStore (ADSA Ten Minutes Saves a Life!) and Google Play (ADSA Ten Minutes Saves a Life! – Apps on Google Play).

Attachment 1

Emergency Medications, Equipment and Indications

MEDICATION/ EQUIPMENT	INDICATION	ADULT DOSE & ROUTE (>66 lb; > 30 kg)	PEDIATRIC DOSE & ROUTE (33 to 66 lb; 15 to 30 kg)
Albuterol metered dose inhaler	Bronchospasm (acute asthma attack)	1-2 puffs Spacer recommended Repeat every 5 minutes, PRN	1-2 puffs Spacer recommended Repeat every 5 minutes, PRN
Aspirin	Suspected myocardial infarction (‘heart attack’)	325 aspirin tablet or 4 x 81 mg tablets	N/A
Diphenhydramine	Allergy (non-life threatening)	50 mg IM (vastus lateralis)	25 mg IM (vastus lateralis)
Epinephrine autoinjector	Anaphylaxis (life threatening allergy)	0.3 mg IM vastus lateralis Repeat every 5 minutes, PRN	0.15 mg IM (vastus lateralis) Repeat every 5 minutes, PRN
Glucose gel (oral)	Hypoglycemia (conscious and able to cooperate)	Squeeze entire content of tube (15 grams glucose gel) into mouth and swallow	Squeeze entire content of tube (15 grams glucose gel) into mouth and swallow
Naloxone nasal spray	Suspected opioid overdose	1 spray (4 mg) naloxone, IN Repeat every 2-3 minutes in alternating nostrils	1 spray (4 mg) naloxone, IN Repeat every 2-3 minutes in alternating nostrils
Nitroglycerin translingual spray	Angina or suspected myocardial infarction	2 metered sprays (0.4 mg x2) on surface on tongue	N/A
Nitroglycerin sublingual tablets	Angina or suspected myocardial infarction	2 sublingual tablets (0.4 mg x2)	N/A
Oxygen	Any emergency (except hyperventilation)	15 liters/minute via face mask	15 liters/minute via face mask
Automated External Defibrillator (AED)	Unconscious and no palpable pulse	As directed by AED	As directed by AED

PRN = as needed

IM = intramuscularly

IN = intranasally

Attachment 2

Management of Medical Emergencies

MEDICAL EMERGENCY	SIGNS & SYMPTOMS (S&S)	MANAGEMENT
ALLERGY- MILD (delayed onset: > 1 hour after exposure to allergen)	• Delayed onset of S&S following administration of drug(s) or ingestion of food: urticaria (itching, hives, rash), either localized or systemic	• Position comfortably • Monitor & record vital signs (BP, O₂ saturation, respiratory rate) • Diphenhydramine 50 mg (>66 lb), 25 mg (up to 66 lb) IM (vastus lateralis) or PO • Observe patient for 1 hour before discharge • Rx diphenhydramine 50 mg (>66 lb), 25 mg (up to 66 lb) Q6h PO for 3 days
ALLERGY - ANAPHYLAXIS (sudden onset: seconds to minutes after exposure to allergen)	• Sudden onset & rapid progression following drug administration • Urticaria, runny nose, watery eyes, flushing • Abdominal cramping • Angioedema (swelling of lips, common) • Lightheadedness • Respiratory distress: wheezing, hoarseness, difficulty speaking • Hypotension (low blood pressure), tachycardia (rapid heart rate) • Possible loss of consciousness	Conscious • Position comfortably Unconscious • Position supine, feet elevated slightly ACTIVATE EMS • ABC, as needed • Epinephrine auto-injector 0.3 mg IM (1:1000 >66 lb) vastus lateralis; 0.15 mg IM (1:1000 up to 66 lb) • Repeat epinephrine Q5 min, until recovery or arrival of EMS • Alternate left & right vastus lateralis • Oxygen (15 liters/minute flow)
ALTERED CONSCIOUSNESS - CEREBROVASCULAR ACCIDENT	• F A S T: Facial droop (ask patient to smile) Arm weakness Speech problems (slurred speech) Time to call 911 • Headache (mild to severe), dizziness, vertigo • Possible loss of consciousness	• Position - Semi-Fowler position • ACTIVATE EMS • Oxygen (15 liters/minute flow) • Nothing by mouth • Monitor & record vital signs (BP, O₂ saturation, respiratory rate)
ALTERED CONSCIOUSNESS - HYPOGLYCEMIA	Conscious • 'Cold, sweating, shaking' • Mental confusion (possible aggressive behavior) • Slurred speech • Pallor, blurred vision • Tachycardia (rapid heart rate) • Possible loss of consciousness	Conscious • Position comfortably • Administer oral carbohydrate: InstaGlucose, orange juice • Permit recovery Unconscious • Position supine, feet elevated slightly ACTIVATE EMS • Oxygen (15 liters/minute flow) • Do not put anything into unconscious victim's mouth • Monitor & record vital signs (BP, O₂ saturation, respiratory rate)
CHEST "PAIN" - ANGINA	Conscious • *Preexisting history of angina* • *Patient will make diagnosis of angina* • Tightness in chest • 'Usual' radiation pattern (commonly left arm, neck & mandible) • 1st time chest 'pain' always assume AMI	• Position comfortably - upright usually preferred • Administer nitroglycerin sublingual tablet(s) or translingual spray • Repeat nitroglycerin Q5 min for maximum of 3 doses, as needed • Oxygen (15 liters/minute flow) • Monitor & record vital signs (BP, O₂ saturation, respiratory rate) • Allow patient to rest; determine cause of acute episode • 1st time chest 'pain' proceed to AMI protocol

Management of Medical Emergencies (page 2 continued)

MEDICAL EMERGENCY	SIGNS & SYMPTOMS (S&S)	MANAGEMENT
CHEST “PAIN” - ACUTE MYOCARDIAL INFARCTION (AMI)	- Conscious - Tightness in chest - Commonly radiates to left arm, neck, and mandible - Crushing pain (‘elephant standing on chest’) - Anginal patient ‘knows’ it’s not angina - Possible loss of consciousness • 1st time chest ‘pain’ always assume AMI	- Position comfortably - upright usually preferred • ACTIVATE EMS - Oxygen (15 liters/minute flow) - If N₂O-O₂ available - administer 50% N₂O - 50% O₂ • Aspirin 325 mg (chewed and swallowed with water), unless allergic - Monitor & record vital signs (BP, O₂ saturation, respiratory rate) - If loss of consciousness, proceed to CARDIAC ARREST protocol
UNCONSCIOUSNESS CARDIAC ARREST	• Unconscious - No breathing - No pulse	- Position supine with feet elevated - patient may remain in dental chair • ACTIVATE EMS - CAB (cycles of 30 compressions, 2 ventilations) - AED retrieved, placed on victim, and activated as quickly as possible - Continue CAB and AED until ROSC or EMS arrive
RESPIRATORY DISTRESS - BRONCHOSPASM	• Conscious - Shortness of breath (dyspnea) - Audible wheezing (not always present) - Patient will assume upright position - Possible cyanosis of mucous membranes	- Position comfortably - upright usually preferred - Administer albuterol (bronchodilator) with metered dose inhaler (1 - 2 puffs, repeated PRN), with spacer if available - If patient is asthmatic: permit to medicate themselves; activate EMS if requested by patient If no relief: • ACTIVATE EMS • Epinephrine auto-injector 0.3 mg IM (1:1000 >66 lb) vastus lateralis; 0.15 mg IM (1:1000 up to 66 lb); repeat epinephrine Q5 min, until recovery or arrival of EMS - Alternate left & right vastus lateralis • No history of asthma: ACTIVATE EMS immediately - Oxygen (15 liters/minute flow) - Monitor & record vital signs (BP, O₂ saturation, respiratory rate)
RESPIRATORY DISTRESS - FOREIGN BODY AIRWAY OBSTRUCTION	If complete obstruction: - Initially conscious - Unable to speak - no sound - Chest movement, but no air exchange - Universal sign for choking (victim clutches neck) - Panic - Cyanosis of mucous membranes • Loss of consciousness If partial obstruction: - Conscious - Cough - forceful or weak - Sound - wheezing or high-pitched crowing sound - Absent or altered voice sounds	If complete obstruction: - Initially conscious - Identify obstruction: “Are you choking?” or universal sign for choking - Apply abdominal thrusts until foreign body expelled or consciousness is lost • Loss of consciousness - Lower victim to ground in supine position, head in neutral position • ACTIVATE EMS - Begin BLS with 30 chest compressions (do not check for pulse) - Before starting ventilation, open victim’s mouth and look for presence of foreign object - If object is seen, remove with Magill intubation forceps, suction, or fingers - Continue BLS until effective or EMS arrive and take over management - EMS evaluate patient post-relief If partial obstruction: - If forceful cough & good air exchange, allow victim to continue coughing without physical intervention by rescuers - If weak cough & poor air exchange, apply abdominal thrusts until foreign body expelled or consciousness is lost - With loss of consciousness, follow complete obstruction steps (above)

Management of Medical Emergencies (page 3 continued)

MEDICAL EMERGENCY	SIGNS & SYMPTOMS (S&S)	MANAGEMENT
RESPIRATORY DISTRESS - HYPERVENTILATION	• Conscious • Anxiousness • Rapid respiratory rate, shortness of breath • Rapid heart rate, palpitations • Tingling or coldness of fingertips, toes & circumoral region • Muscle pain and stiffness • Carpopedal tetany	• Position comfortably - upright usually preferred • Attempt - verbally - to calm patient • Have patient cup their hands over mouth & nose and rebreathe exhaled air • Monitor & record vital signs (BP, O₂ saturation, respiratory rate) • When episode terminates, determine cause of hyperventilation • If longer than 10 minutes, ACTIVATE EMS • Oxygen is NOT indicated in management of hyperventilation
SEIZURES - EPILEPSY (Generalized tonic-clonic seizure [GTCS, "Grand Mal"] - most common)	• GTCS • Conscious - epileptic aura (e.g. smell, sound, vision) • heralds onset of convulsions • Loss of consciousness • Muscle rigidity, possible cyanosis of mucous membranes • Jerking movements of limbs • Noisy breathing • Frothing at mouth (may be pink/red if tongue bitten) • Incontinence may occur when convulsions end	• Position supine with feet elevated • Protect victim from injury (gently hold arms & legs - do not restrain) during seizure • Do not put anything into victim's mouth • If no history of seizures, ACTIVATE EMS • If history of epilepsy: - Consult victim's escort, guardian or parent and consider EMS - When convulsions cease, place victim in recovery position (turn onto right side, if possible) - Assess ABC, Airway (head tilt - chin lift) if snoring - Oxygen (15 liters/minute flow) - Monitor & record vital signs (BP, O₂ saturation, respiratory rate) - If seizure is prolonged (>5 minutes) or repeats, ACTIVATE EMS
SEIZURES - LOCAL ANESTHETIC OVERDOSE (LAST - Local Anesthetic Systemic Toxicity)	• GTCS • Loss of consciousness • Muscle rigidity, possible cyanosis of mucous membranes • Jerking movements of limbs • Noisy breathing • Frothing at mouth (may be pink/red if tongue bitten)	• Position supine with feet elevated • Protect victim from injury (gently hold arms & legs - do not restrain) during seizure • Do not put anything into victim's mouth • ACTIVATE EMS • When convulsions cease (~1 minute), place victim in recovery position (turn onto right side, if possible) • Oxygen (15 liters/minute flow) • Assess ABC, Airway (head tilt - chin lift) is critical • Monitor & record vital signs (BP, O₂ saturation, respiratory rate)
UNCONSCIOUSNESS - CNS-DEPRESSANT OVERDOSE Benzodiazepine or other non-opioid	• Unintended loss of consciousness following CNS- depressant administration (e.g. benzodiazepine) • Airway obstruction (tongue) common • Inability to maintain a patent airway • Snoring	• Position supine with feet elevated • ABC as needed, Airway (head tilt - chin lift) essential • Oxygen (15 liters/minute flow) • Monitor & record vital signs (BP, O₂ saturation, respiratory rate) • If benzodiazepine, and if IV route available, flumazenil (0.2 mg IV, repeated Q1 minute) to a maximum of 1 mg over 5 minutes) • Following flumazenil, monitor patient 2 hours (following IV BZD), 4 hours (following PO BZD) post recovery, before discharge, to ensure resedation does not occur • Consider EMS

Management of Medical Emergencies (page 4 continued)

MEDICAL EMERGENCY	SIGNS & SYMPTOMS (S&S)	MANAGEMENT
UNCONSCIOUSNESS - CNS-DEPRESSANT OVERDOSE Opioid	- Unintended loss of consciousness following opioid (narcotic) administration - Respiratory depression common (decreased rate of breathing) - Inability to maintain a patent airway - Snoring	- Position supine with feet elevated - ABC as needed, Airway (head tilt - chin lift) and Breathing (assisted or controlled) are essential - Oxygen (15 liters/minute flow) - Monitor & record vital signs (BP, O₂ saturation, respiratory rate) - If IV route available, naloxone (0.4 mg IV, every 2 to 3 minutes PRN to a total dose of 10 mg) - If no IV available - IN naloxone (1 spray IN [4 mg], repeat every 2 to 3 minutes in alternating nostrils PRN) Consider EMS
UNCONSCIOUSNESS - POSTURAL HYPOTENSION	- Immediate loss of consciousness when standing rapidly or when rapidly repositioned upright - No prodromal signs & symptoms	- Normally, rapid return of consciousness when positioned supine with feet elevated ABC as needed - Oxygen (15 liters/minute flow) - Monitor & record vital signs (BP, O₂ saturation, respiratory rate)
UNCONSCIOUSNESS - SYNCOPE	- Presyncope - feels faint, dizzy, lightheaded, profuse sweating (diaphoresis), pallor Loss of consciousness - Bradycardia (slow heart rate), hypotension (low blood pressure) - Possible nausea, vomiting on recovery	- Position supine with feet elevated - Normally, rapid return of consciousness with positioning CAB, as needed - Monitor & record vital signs (BP, O₂ saturation, respiratory rate) - On recovery - administer sugar (e.g. InstaGlucose or orange juice) orally Oxygen (15 liters/minute flow) - Cold compress to forehead Determine cause of faint - If recovery delayed - ACTIVATE EMS

ABC - Airway, Breathing, Circulation
AED - automated external defibrillator
AMI - acute myocardial infarction
BLS - basic life support
BZD - benzodiazepine

CAB - Circulation, Airway, Breathing
EMS - emergency medical services (911)
IN - intranasal
N₂O-O₂ - nitrous oxide - oxygen

PO - oral administration
PRN - taken as needed
ROSC - return of spontaneous circulation
Semi-Fowler position - 30° upright

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POST-TEST

Internet Users: This page is intended to assist you in fast and accurate testing when completing the “Online Exam.” We suggest reviewing the questions and then circling your answers on this page prior to completing the online exam.

(1.0 CE Credit Contact Hour) Please circle the correct answer. 70% equals passing grade.

1. Which of the following is most likely to be encountered as a cause of unconsciousness in a 24-year-old male patient?
 - a. adrenocorticosteroid deficiency
 - b. hypotension
 - c. hyperglycemia
 - d. syncope
 - e. cardiac arrest
2. The very first step in management of a conscious patient experiencing respiratory distress is:
 - a. placement in the most comfortable position
 - b. Placement in the supine position with feet elevated slightly
 - c. administration of oxygen-enriched air
 - d. administration of an ammonia-vaporole
 - e. administration of 100% oxygen
3. Emergency medical assistance should be sought:
 - a. only when the pulse is absent.
 - b. when breathing is absent.
 - c. whenever you, the doctor, feel it is warranted.
 - d. as soon as possible in every medical emergency situation.
4. The first step in managing a conscious patient experiencing chest ‘pain’ is:
 - a. administration of oxygen-enriched air.
 - b. administration of 100% oxygen.
 - c. placement in the most comfortable position.
 - d. placement in the supine position with feet horizontal.
 - e. placement in the supine position with feet elevated slightly.
5. The single most important step in the management of all emergency situations, without exception, is?
 - a. administration of oxygen
 - b. summoning EMS
 - c. administration of aromatic ammonia
 - d. basic life support, as needed
 - e. None of the above
6. Which of the following emergency drugs may be administered to the “victim” of any and all medical emergencies?
 - a. epinephrine
 - b. diphenhydramine
 - c. oxygen
 - d. nitroglycerin
 - e. albuterol
7. Can effective chest compressions be applied with the victim lying in the dental chair?
 - a. yes
 - b. no
8. In cardiac arrest, what ratio of chest compressions to rescue breaths is used for one-person resuscitation of the infant, child and adult victim?
 - a. 5 compressions: 1 ventilation
 - b. 10 compressions: 1 ventilation
 - c. 15 compressions: 2 ventilations
 - d. 30 compressions: 2 ventilations
 - e. 60 compressions: 2 ventilations
9. The goals of Emergency Medical Services during a medical emergency are defined as follows:
 - a. drug administration and oxygenation
 - b. chest compression and defibrillation
 - c. save the life, stabilize and transport, if needed
 - d. positioning and administration of CPR
10. Which of the following represents THE most important drug in the emergency kit?
 - a. epinephrine
 - b. aspirin
 - c. nitroglycerin
 - d. oxygen
 - e. albuterol

