

## Medical Emergencies in the Dental Office *2022 Update*

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Medical emergencies can and do happen in the dental office. Management of medical emergencies involves the following three components:

1. **Prevention** involves proper pretreatment evaluation of your patient and assessment of medical risk, including consultation with the patient’s physician if indicated.

2. **Preparation** for medical emergencies including maintenance of office emergency equipment and emergency drugs, assignment of roles to office staff in case of an emergency, periodic simulated medical emergencies to evaluate the response of office personnel to such emergencies, knowledge of the presence of other nearby health personnel who could assist you in an emergency, and familiarity with the emergency response system in your community.

The ability to administer oxygen under positive pressure (bag-valve-mask), the presence of an automated external defibrillator (AED), and a dentist current in Basic Life Support (BLS) are paramount for patient safety.

### 3. **Emergency Assessment**

- Assess state of consciousness
- Airway
- Assess patency
- Use of head tilt, chin lift if necessary
- Breathing
- If breathing, 100% oxygen
- If not, positive pressure ventilation with 100% oxygen (bag-valve-mask)
- Circulation

- Assess pulse if present, obtain vital signs, if no pulse CPR/AED, call 911
- Decision on whether to call for help (911)

### **Altered Mental Status**

#### *Syncope/Neurocardiogenic Syncope*

This may occur as the result of a stress reaction such as during a local anesthetic injection. As a result of the neurohumoral response to the stress of dental care, blood pools in the large capacitance blood vessels within skeletal muscles of the lower extremities and in the abdomen, resulting in decreased blood returning to the heart with subsequent reduction in blood flow to the brain. Syncope is often preceded by a prodromal, presyncopal period warning of the impending loss of consciousness (dizziness, paleness, sweating) and the patient may abruptly lose consciousness. If prolonged, the patient may have a seizure due to the lack of oxygen in the brain.

#### Treatment:

1. Remove all objects from the mouth. Place the patient into a supine position with legs elevated, thus allowing gravity to restore blood flow from the lower extremities back to the heart, increasing cardiac output, and restoring blood flow to the brain.
2. If the patient is unconscious, ensure a patent airway.

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3. If airway is obstructed, then head tilt and chin lift. In the event that the patient does not respond to the supine position, crushing of an ammonia ampule beneath the patient's nose will usually elicit a vigorous return to consciousness in the patient.

4. If the patient does not respond at this point, it is safe to assume that there is another cause of the patient's unconsciousness and one should activate the EMS system.

### POSTURAL (ORTHOSTATIC) HYPOTENSION

A condition similar to syncope in that it can produce unconsciousness. Postural hypotension occurs when the patient returns suddenly to an upright position following a prolonged period in the supine position of the dental chair. The problem arises at the completion of the procedure and is not associated with the local anesthetic injection or the procedure. There is usually no prodromal period, and it is more commonly seen in the elderly as well as those taking certain medications such as diuretics, nitrates, antihypertensive drugs, and older antipsychotic medications.

#### Treatment:

1. Immediate return to the supine position.
2. Allowing the patient to return to a vertical position gradually and in stages over a period of 5-10 minutes, thus allowing the body to adjust to the increasing effect of gravity on the body's blood volume as one assumes an upright position. Vital signs should be taken after each new position is achieved.
3. Failure of the condition to improve or failure to reach a point where the patient can stand without becoming light-headed may indicate over-medication with the patient's systemic medication and thus the patient should be transferred to an emergency room for further evaluation.

### CHEST PAIN

#### Angina/Myocardial Infarction

Most likely to occur in patients with a history of coronary artery disease (angina pectoris, previous myocardial infarction, stent placement, pacemaker or automated external defibrillator placement). Chest pain may result from exacerbation of stable angina pectoris during stressful periods in the dental office or from a myocardial infarction, which may occur during stress or during non-stressful moments. One important concept to keep in mind is that in order for a dentist to

label a patient's chest pain as angina, that patient must have a previous history of angina! If your patient has no history of heart disease and experiences chest pain that you feel is cardiac in origin, one needs to immediately suspect a myocardial infarction.

#### Treatment:

1. Patient with history of stable angina pectoris and the chest pain arises during a particularly stressful period of the treatment.
  - A. Placement into the semi-reclined position
  - B. Nitroglycerin 0.4 mg. tablet sublingually or Nitroglycerin oral spray to the tongue
  - C. May be repeated two times every five minutes to a total 3 doses over ten minutes
  - D. If chest pain is not relieved, assume the pain is due to a myocardial infarction and activate EMS services.
  - E. Do not administer if systolic blood pressure is not >90 mg Hg

#### Myocardial Infarction

If any patient (including those without a history of coronary artery disease) experiences acute crushing or radiating chest pain and the pain is not relieved by three doses nitroglycerin, then until proven otherwise one should assume the patient is having a myocardial infarction. It may be accompanied by cyanosis, dyspnea, sweating, or hypotension.

#### Treatment

1. Placement into the semi-reclined position
2. Immediate activation of EMS services
3. Oxygen via nasal hood, nasal cannula or mask
4. If not already used, give nitroglycerin as noted above
5. Aspirin 160-325 mg chewed and swallowed
6. Retrieve AED
7. Be prepared for CPR if the patient goes into cardiac arrest

### CARDIAC ARREST

In the dental office, this is most likely the result of the onset of a lethal cardiac dysrhythmia incompatible with life. most commonly ventricular tachycardia/fibrillation. Most common in patients with risk factors for coronary artery disease or for patients with a

history of coronary artery disease, but can occur to any patient. In the patient who does not fit the profile for coronary artery disease, (e.g., children, teenagers, young adults), one should also be suspicious of circumstances that can cause hypoxia (e.g., airway obstruction), which could lead to cardiac arrest from brady-asystolic dysrhythmias.

#### Treatment

Depending on the circumstances:

1. Immediate activation of EMS services and calling for help
2. Immediate CPR
  - Chest Compressions 100 -120/minute
  - Ratio 30 compression to 2 ventilations
3. Turn on AED and follow prompts

### **SEIZURES**

Acute seizure activity manifested by convulsions can occur in patients:

- With a history of epilepsy – often induced by stress
- Cerebral hypoxia due to airway obstruction such as in syncope
- Hypoglycemia
- Hyperventilation during anxiety attack
- Local anesthetic toxicity
  - A. Exceeding the maximum recommended dosage
  - B. Intravascular injection

#### Treatment:

1. Call 911
2. Remove all objects from the mouth
3. Protection of patient from injury
  - Lightly restrain
  - Ensure patient is not biting on tongue
4. Administer 100% oxygen and assist or control ventilation as needed

### **Hypoglycemia**

(Low Blood Sugar)

This acute condition can be seen in diabetic patients taking insulin to control their blood sugar levels or patients who have been fasting. Hypoglycemia may cause an altered state of consciousness ranging from confusion to complete loss of consciousness, along with sweating and tachycardia.

#### Treatment:

##### Conscious patient:

Source of oral glucose – i.e., non-dietetic sugar/juice or candy

##### Unconscious patient:

- Never administer anything orally to an unconscious patient
- Activate 911
- Ensure ventilation and oxygenation
- BLS as needed – mainly for airway maintenance until help arrives

### **CEREBROVASCULAR ACCIDENT (STROKE)**

Signs and symptoms may include facial droop and/or numbness, arm drift, blurred vision, sudden severe headache, slurred speech

#### Treatment:

1. Immediate recognition and activation of emergency medical services and inform dispatcher of possible stroke. Note time and symptoms.
2. Semi-reclined position
3. Monitor ABC's - BLS if patient loses consciousness
4. Cautious use of oxygen -  
Only if patient has dyspnea or becomes cyanotic. If pulse oximeter available titrate oxygen to 98%

### **HYPERSENSITIVITY (ALLERGIC) REACTION**

Usually resulting acutely from drug administration in the dental office.

#### 1. **Mild/Delayed**

Slow to develop (rash or itchiness) >60 minutes since drug was given delayed cutaneous (skin) – no respiratory/C-V involvement

#### Treatment:

- Diphenhydramine (Benadryl) 50 mg. P.O. or I.M.
- Warn about possible sedative effects of diphenhydramine

#### 2. **Major**

Wheezing, rapid development of hives, shortness of breath, flushing, hypotension, decreased oxygen saturation



### Treatment:

- Activate 911
- Remove causative agents
- Administer 100% Oxygen  
Epinephrine 0.3 mg. IM, can repeat q 3-5 minutes IM into vastus lateralis (thigh)

### **ASTHMA**

(Bronchospasm)

Characterized by acute wheezing and difficulty breathing. Patients will usually present with a history of asthma and most will carry an albuterol MDI (Metered Dose Inhaler) as a rescue medication.

### Treatment:

1. Patients are usually most comfortable in the sitting position, often times leaning forward.
2. Oxygen via nasal cannula, nasal hood, or mask
3. Albuterol MDI - two to three activations of the inhaler
4. If condition deteriorates after use of the inhaler, or if patient become cyanotic and hypoxic, immediately call 911
5. Consider epinephrine (0.3 mg. of a 1:1000 concentration), IM into vastus lateralis (thigh)

### **Hyperventilation**

Most commonly seen in young, healthy females as a manifestation of response to stress and anxiety. The signs and symptoms of this condition include a visibly anxious patient breathing at an increase respiratory. This results from a chemical imbalance as carbon dioxide levels are lowered.

### Treatment:

Remove all objects from the mouth

1. Semi-recumbent to sitting position
2. Remain calm and reassure patient that you understand what is happening
3. Verbally encourage and coach them to decrease their respiratory rate
4. Encourage them to breath into their cupped hands in front of their mouth and nose.
5. If longer than 10 minutes, call 911

### **Choking**

(Foreign Body Obstruction)

During the course of dental treatment, objects of dental origin may be lost in the hypopharynx. Most of the time, they are simply swallowed and make their way through the alimentary tract. If the dentist has any doubt that, in fact, the object may have been aspirated into the pulmonary tract, the patient must be sent for a chest x-ray immediately.

If the object becomes lodged in the upper airway, it may cause partial or complete airway choking and airway obstruction. Signs and symptoms range from rasping, wheezing, coughing, and total airway obstruction leading to cyanosis, hypoxia, and unconsciousness.

### Treatment:

1. Sit the patient upright
2. Encourage coughing
3. If patient is unable to speak or cough, then immediately administer abdominal thrusts until the object is removed. (For the obese and/or pregnant patient, chest thrusts are advised.)
4. Call 911
5. If the patient becomes unresponsive, begin CPR and look in the mouth before initiating ventilations. Never attempt blind finger sweeps to locate the object.

### **Conclusion**

The best way to manage a medical emergency in the dental office is to avoid the emergency in the first place by knowing your patient's medical history. A well-trained and well-equipped dental office, which practices and anticipates medical emergencies, can address acute medical issues effectively and well.

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