



Medical Emergencies in the Dental Office

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Medical emergencies can happen, and do happen, in the dental office. Management of medical emergencies involves the following four 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.

3. **Recognition** of medical emergencies; most often they will appear as:

- Altered mental status
- Chest pain
- Respiratory difficulty
- Seizures
- Drug-related emergencies
- Adverse drug reaction
- Allergy

4. **Treatment of the Emergency**

In all medical emergencies, of utmost importance is the provision of the Basic Life Support sequence of P-A-B-C (although the 2010 BLS guidelines describe a P-C-A-B sequence, unless you are dealing with a true cardiac arrest in your office, the dental office medical emergency protocol is more suited to the old BLS guidelines because most of these dental office emergencies occur in patients who still have spontaneous organized cardiac activity) as the initial management of any emergency. As you will see, some of the emergencies will respond favorably to proper positioning of the patient.

Treatment

SYNCOPE: Now known by the more modern term **NEUROCARDIOGENIC SYNCOPE**

One is most likely to see this occur in young, healthy, well-conditioned male patients during or after the local anesthetic injection, or during surgery. 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. Often preceded by a prodromal, presyncopal period warning of the impending loss of consciousness, the patient will then abruptly lose consciousness, sometimes also having a seizure due to the lack of oxygen in the brain.

Treatment:

1. Placing 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. While unconscious, maintenance of the airway and insuring that the patient is breathing is of paramount importance.
3. In the event that the patient does not respond to the supine position, crushing of an ammonia ampul 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 in your community.

POSTURAL (ORTHOSTATIC) HYPOTENSION

A condition similar to syncope in that it can produce unconsciousness, postural hypotension occurs when the patient returns 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 older patient

as well as those taking certain classes of 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

Most likely to be seen 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 be kept 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, it needs to be managed as 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 arising from a myocardial infarction and activate EMS services.
2. Patient has no history of coronary artery disease, pain is not relieved by three doses of nitroglycerin, or the chest pain is more intense than usual and/or is accompanied by cyanosis, dyspnea, sweating, or hypotension, proceed as if you are managing a myocardial infarction.
 - A. Placement into the semi-reclined position
 - B. Immediate activation of EMS services

- C. Oxygen 4-6 L/min. via nasal hood or nasal cannula
- D. If not already used, give nitroglycerin as noted above
- E. Aspirin 160-325 mg. chewed and swallowed
- F. Prepare for BLS if 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 in the patient with risk factors for coronary artery disease or the patient with a history of coronary artery disease. In the patient who does not fit the profile for coronary artery disease, ie. children, teenagers, young adults, one should be suspicious of circumstances that can create hypoxia (foreign body aspiration) 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. Adult basic life support
3. Pediatric basic life support

SEIZURES

In dentistry, we most often see seizures from:

1. Epilepsy – often induced by stress
2. Cerebral hypoxia from poor airway
Syncope
3. Hypoglycemia
4. Hyperventilation during anxiety attack
5. Local anesthetic toxicity

Treatment – 4 principles

- A. Protection of patient from injury
- B. Removal of any intraoral appliances /dentures if possible
- C. Airway management as per BLS
- D. Activation of 911

HYPOGLYCEMIA

Also known as insulin shock, this condition is usually seen in patients taking insulin to control their blood sugar levels. Hypoglycemia will 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:

Activate EMS services

BLS as needed – mainly for airway maintenance until help arrives

CEREBROVASCULAR ACCIDENT (STROKE)

The most common cause of stroke in a dental office is a hemorrhagic stroke, resulting from the rupture of a cerebral blood vessel. Usually of note is the presence of a severe headache, often described as the most painful headache the patient ever experienced, along with a focal neurological deficit that can progress to complete unconsciousness.

Treatment: Mainly supportive

1. Immediate recognition and activation of emergency medical services
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

HYPERSENSITIVITY (ALLERGIC) REACTION

Usually resulting from drug administration, three main organ systems can present as medical emergencies in the dental office.

1. Skin
 - A. Immediate – <60 minutes since drug was given
 - B. Delayed – >60 minutes since drug was given
2. Respiratory
 - A. Upper airway – inspiratory stridor – laryngeal edema
 - B. Lower airway – expiratory wheezes – bronchial constriction
3. Cardiovascular – Generalized anaphylaxis

Treatment:

1. Delayed cutaneous (skin) – no respiratory/C-V involvement
 - A. Benadryl 50 mg. (25 mg. Pedo.) P.O. or I.M.
2. All other organ systems:
 - A. Activate EMS services
 - B. Epinephrine 0.3 mg. (0.15 mg. Pedo) IM, can repeat q 3-5 minutes
 - C. Benadryl 50 mg. (25 mg. Pedo.) IM

ASTHMA

Characterized by 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 of an asthma attack is similar to treatment of an allergic reaction involving the lower respiratory tract.

Treatment:

1. Patients are usually most comfortable in the sitting position, often times leaning forward.
2. Oxygen via nasal cannula or nasal hood
3. Albuterol MDI – two to three activations of the inhaler
4. Epinephrine 0.3 mg. IM
5. Be prepared to activate EMS services if condition deteriorates

HYPERVENTILATION

Most commonly seen in young, healthy females as a manifestation of their anxiety (anxiety attack), the signs and symptoms of this condition result from blowing off too much carbon dioxide from their lungs, thus raising the pH of their blood beyond what is considered normal.

Treatment:

1. Semi-recumbent to sitting position
2. Reassure patient – try to inform patient of their abnormally deep and rapid breathing pattern and try to get them to slow their breathing.
3. Maneuvers to retain carbon dioxide
 - A. Breath into a brown paper bag
 - B. Breath into a non-rebreather face mask, if available
 - C. Have patient breath into their hands cupped in front of their mouth and nose

Conclusion

In summary, 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. The old adages "Never treat a stranger" and "All patients are strangers after six months" go a long way in helping you decrease the chances of an emergency arising. ■

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Dr. Jones graduated from Temple University School of Dentistry in 1974. Following a three-year tour of active duty in the United States Air Force, he completed a residency in Oral & Maxillofacial Surgery at Temple University Hospital and School of Dentistry. He has been on the full-time and part-time faculty of Temple University Kornberg School of Dentistry since 1981, and presently is Associate Clinical Professor and Director of the Center for Oral & Maxillofacial Surgery at Temple. He had a private practice of Oral & Maxillofacial Surgery in Glenside, PA for 23 years before returning to Temple full-time. He is also an Attending in Oral & Maxillofacial Surgery at Temple University Hospital. He is a Diplomate of the American Board of Oral & Maxillofacial Surgery and the International Congress of Implantologists, a Fellow of the American Association of Oral & Maxillofacial Surgeons, and a member of the American Dental Society of Anesthesiology. He presently serves as an examiner for the Oral Certifying Examination of the American Board of Oral & Maxillofacial Surgery, and does Peer-Review for the Journal of Oral & Maxillofacial Surgery.



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