MEDICAL EMERGENCIES

Andrea Fonner, DDS
Dentist Anesthesiologist

Diplomate-American Dental Board of Anesthesiology
Diplomate-National Dental Board of Anesthesiology
Fellow-American Dental Society of Anesthesiology

Disclosers

Board of Directors, American Dental Society of Anesthesiology (ADSA)


Receive no reimbursement for either position
Medical Emergencies

Part 1: Office preparation
Part 2: Common medical emergencies in the dental office

How Much Do You Really Need To Know?

Keep the patient alive by treating them until recovery or until another more qualified individual assumes responsibility for treatment
Office Preparation For Medical Emergencies

Washington State Law

WAC 246-817-724

Recordkeeping, equipment and emergency medications or drugs required in all sites where anesthetic agents of any kind are administered.

(1) Dental records must contain an appropriate medical history and patient evaluation. Any adverse reactions, and all medications and dosages, must be recorded.
Washington State Law

WAC 246-817-724

(2) When sedation of any level is to be administered, excluding minimal sedation by inhalation, presedation vitals including, but not limited to, blood pressure and heart rate must be obtained and recorded, unless the cooperation of the patient or circumstance of the case will not allow it. If presedated vitals cannot be obtained, the reason(s) why must be recorded.

Washington State Law

(2) Office facilities and equipment must include:

(a) Suction equipment capable of aspirating gastric contents from the mouth and pharynx;

(b) Portable oxygen delivery system including full face masks and a bag-valve-mask combination with appropriate connectors capable of delivering positive pressure, oxygen enriched ventilation to the patient;

(c) Blood pressure cuff (sphygmomanometer) of appropriate size;

(d) Stethoscope or equivalent monitoring device.
Washington State Law

(3) The following emergency drugs must be available and maintained:

(a) Bronchodilator;
(b) Sugar (glucose);
(c) Aspirin;
(d) Antihistaminic;
(e) Coronary artery vasodilator;
(f) Anti-anaphylactic agent.

______________________________
Reversal agent(s)-with delivery device

Washington State Law

WAC 246-817-755

Moderate sedation

(3) Equipment and emergency medications: all offices must comply with the requirements listed in WAC 246-817-724. When a sedative drug is used that has a reversal agent, the reversal agent must be in the office emergency kit and the equipment to administer the reversal agent must be stored with the device. Pulse oximetry equipment or equivalent respiratory monitoring equipment must be available in the office.
Office Preparation: Manuals

Written Emergency Protocol (unique to your office)
Emergency Manual (crisis checklist)
Office Preparation:
Written Emergency Protocol

Location/contents of the emergency kit

Emergency evacuation (including fire/smoke evacuation with sedated patient)

911 protocols

Meet EMS at the door/hold the elevator

Have phone number and address next to all phones AND in all operatories

Establish a universal treatment emergency protocol with your staff

Universal Treatment Algorithm

**R - Recognition of Emergency**
Call for assistance: retrieve O2, AED, and emergency kit
Remove material from mouth

**P - Position**
- If conscious, comfortable for patient; usually sitting upright
- If unconscious, supine

**A - Airway**
Assess airway patency
- If obstructed, head tilt–chin lift (reposition if necessary with airway adjuncts like jaw thrust, oral/nasal airway)

**B - Breathing**
Assess breathing
- If breathing, O2 as directed by pulse oximetry with 100% O2 @ 10 L/min via facemask
- If evidence of breathing difficulty or not breathing, call 911; positive pressure ventilation with BVM @ 10L/min 100% O2

**C - Circulation**
Assess pulse
- If pulse, check heart rate and blood pressure, record vital signs at least every 5 minutes
- If no pulse, call 911; move to Cardiac Arrest Algorithm

**D - Diagnosis, Definitive Therapy**

**E - Emergency Medical Services**
Facilitate access of emergency personnel by waiting for arrival and escorting to office
Universal Treatment

<table>
<thead>
<tr>
<th>Universal Treatment</th>
<th>Staff #1</th>
<th>Staff #2</th>
<th>Staff #3</th>
<th>Staff #4</th>
<th>Other staff members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of Event</td>
<td>Call for help Stay with patient</td>
<td>Get emergency kit, AED and oxygen</td>
<td>Help with emergency kit</td>
<td>Alert others in office</td>
<td></td>
</tr>
<tr>
<td>Patient Position</td>
<td>Position patient properly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airway/Breathing</td>
<td>Check for a patent airway and breathing</td>
<td>Set up oxygen</td>
<td>Place monitors</td>
<td>Record findings</td>
<td></td>
</tr>
<tr>
<td>Circulation</td>
<td>Check for pulse</td>
<td>Assist with BLS as needed</td>
<td>Get vitals</td>
<td>Record findings</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Diagnose problem</td>
<td>Assist with BLS as needed</td>
<td>Monitor vital signs</td>
<td>Call 911**</td>
<td></td>
</tr>
<tr>
<td>Definitive Therapy</td>
<td>Drugs if applicable</td>
<td>Prepare drugs</td>
<td>Continue recording</td>
<td>Stay on phone, relay instructions</td>
<td>Meet EMS personnel</td>
</tr>
<tr>
<td>EMS/Transport</td>
<td>May or may not accompany patient</td>
<td>Review notes</td>
<td>Restore office to normal</td>
<td>Call family of patient</td>
<td></td>
</tr>
<tr>
<td>Afterwards</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Debriefing session is critical</td>
</tr>
</tbody>
</table>

Office Preparation: Manual of Emergency Protocols

A checklist you can use during an emergency to help the team be more involved, double check medication doses, and make sure you are doing everything you can before EMS arrives or the issue resolves

Allows you to be more thoughtful about the crisis

Many states now require this type of manual
Simulation-Based Trial of Surgical-Crisis Checklists

This article details the results of 17 surgical teams participating in 106 simulated surgical-crisis scenarios.

Use of an emergency checklist reduced “missed steps” from 23% to 6% in these simulated emergencies using high fidelity human simulators.

Ten Minutes Saves A Life!

The goal of the Ten Minutes Saves A Life® ADSA Anesthesia Research Foundation initiative is to optimize patient safety and outcomes in office medical emergencies.

This program supports crisis resource management team training in the use of emergency drugs and equipment during the critical ten minute interval between recognition of a patient's medical emergency and arrival of EMS (emergency medical service) personnel.

Practitioners should be familiar with the suggested emergency drugs/equipment and have them immediately available.

www.adsahome.org
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Ten Minutes App

Contact Us:
Name:  
Email:  
Phone:  
Message:  
Provider Categories

**Level I:**
General/specialty dentist using only local anesthesia or nitrous oxide/oral minimal/oral moderate sedation

**Level II:**
General/specialty dentist can urgently initiate IV access but does not provide deep sedation/general anesthesia (provides IV moderate sedation routinely). Provider is current in BLS. May be current in ACLS and/or PALS.

**Level III:**
Dentist providing deep sedation/general anesthesia. Provider is current in BLS and ACLS and/or PALS.
1 - Respiratory
1-1 Allergic Reaction
swelling, shortness of breath
1-2 Aspiration
altered breath sounds, wheezing
1-3 Asthma / Bronchospasm
wheezing, labored breathing
1-4 Chest Wall Rigidity
unable to breath or ventilate following opioid administration
1-5 Foreign Body Airway Obstruction
rasping, wheezing, coughing
1-6 Hyperventilation
rapid breathing
1-7 Laryngospasm
racking breath or crowing breathing, difficult or impossible ventilation
1-3 Ventilation & Oxygenation
hypoxia, hypoventilation, soft tissue obstruction
Hypoxia
low blood oxygen saturation
Hypoventilation
decreased respiratory rate
Soft Tissue Obstruction
inability to maintain a patent airway

2 - Cardiac
2-1 Chest Pain
Acute Coronary Syndrome
Angina
Myocardial Infarction
acute subeminal crushing chest pain or pressure which may radiate to either arm or jaw, BP decreased or elevated, shortness of breath, cyanosis, sweating
2-2 Bradycardia (Symptomatic)
low heart rate with hypotension
2-3 Cardiac Arrest
Pulseless Patient
unresponsive, no carotid pulse
2-4 Hypertension
blood pressure > 180/120, chest pain, altered mental status
2-5 Hypotension
low blood pressure with dizziness, light headedness, confusion, chest pain, shortness of breath
2-6 Stroke
Cerebrovascular Accident
facial droop, arm drift, slurred speech sudden, severe headache
2-7 Tachycardia
child: heart rate ± 180 beats per minute
adult: heart rate ± 150 beats per minute

3 - Other
3-1 Low Blood Sugar / Hypoglycemia
sweaty, dizzy, pale, disoriented, rapid heart rate
3-2 Local Anesthetic Toxicity
nausea, dizziness, slurred speech, seizures, arrhythmias, unconsciousness
3-3 Nausea & Vomiting
retching, heaving, vomiting
3-4 Seizure
convulsions, blank stare, unaware
3-5 Syncope / Altered Mental Status
dizziness, light headedness, paleness, swirling, altered mental status, unconsciousness
LV 2 - Asthma / Bronchospasm

Wheezing, decrease in SaO2, difficulty breathing, lack of breath sounds

**ACTIONS**

1. Administer 100% oxygen
2. Administer albuterol
3. Assist cough
4. If severe, administer epinephrine
5. Administer 100% oxygen
6. Reverse sedative drugs

---

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LV 2 - Asthma / Bronchospasm

**EMERGENCY DRUGS**

Patient's Weight: 160 lbs

**RESET DOSAGES**

- **Albuterol Inhaled**
  - **Dose 1:** 80 mcg
- **Flumazenil IV (Adult)**
  - **Dose 1:** 0.5 mg
- **Flumazenil IV (Ped)**
  - **Dose 1:** 0.2 mg
- **Naloxone IV/M**
  - **Dose 1:** 2.0 mg
- **Epinephrine IM**
  - **Dose 1:** 0.30 mg

---

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---
Asthma / Bronchospasm

Wheezing, difficulty breathing, increased respiratory effort

ACTIONS
1. Administer 100% oxygen
2. Administer albuterol
3. If unresolved Call 911
4. Reverse sedative drugs
5. Administer IM epinephrine additional doses may be necessary

Emergency Drug | 150 lbs | 68 kg | Initial Dose |
--- | --- | --- | --- |
Albuterol Inhaled | 90 mcg | | info |
Flumazenil IV (Adult) | 0.5 mg | | info |
Flumazenil IV (Peds) | 0.5 mg | | info |
Naloxone IV/IM | 0.24 mg | | info |
Epinephrine IM | 300 mcg | | info |

Patient Assessment (Provider Level 2)

R - Recognition of emergency
Call for assistance: retrieve O2, AED, and emergency kit

P - Position
If conscious, comfortable for patient; usually sitting upright
If unconscious, supine

A - Airway (assess airway patency)
If obstructed, head tilt–chin lift–jaw thrust (reposition if necessary with airway adjuncts like oral/nasal airway).

B - Breathing (assess breathing)
If breathing, provide 100% oxygen
If evidence of breathing difficulty or not breathing, positive pressure ventilation with BVM @ 10L/min 100% O2.

C - Circulation (assess pulse)
If pulse, check heart rate and blood pressure
If no pulse, call 911; move to Cardiac Arrest Algorithm

Evaluate

> Respiratory

> Cardiac

> Other
Patient Assessment
Patient Info
LA Calculator
Emergency Drugs
Drug Expiration
Provider Level
Appendix

Patient Information
Anthropometric

<table>
<thead>
<tr>
<th>lbs</th>
<th>kg</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>68.0</td>
<td>27</td>
</tr>
</tbody>
</table>

DOB: Age: BMI:

CALCULATE BMI

Allergies

- Aspirin

LA Calculator

Chart for adult patients. Pediatric AAPD Guidelines in chart below. AAPD guidelines have lower maximum dose than the manufacturer's package insert.

Manufacturer's Package Insert Calculation

AAPD Guidelines Calculation
### Local Anesthetic Calculator

**Chart for adult patients. Pediatric AAPD Guidelines in chart below. AAPD guidelines have lower maximum dose than the manufacturer's package insert.**

**Manufactures package insert calculation**  
150 lbs  
68 kg

<table>
<thead>
<tr>
<th>Type</th>
<th>Max Dose (mg/kg)</th>
<th>MAX Calc (mg)</th>
<th>Absolute MAX Cartridge #</th>
<th># Cartridge Used (Input)</th>
<th>% MAX Used</th>
</tr>
</thead>
</table>
| Articaine: 4% w/ epinephrine  
Note: Age > 4 y.o. | 7.0              | 477           | 6.6                      | 1.5                      | 22.7%      |
| Lidocaine: 2% w/ epinephrine | 7.0 up to 500mg | 477           | 13.3                     | 1.5                      | 22.7%      |
| Mepivacaine: 3% plain | 6.6 up to 400mg  | 400           | 7.4                      | 1.5                      | 22.7%      |
| Mepivacaine: 2% w/ levonordefin | 6.6 up to 400mg | 400           | 11.1                     | 1.5                      | 22.7%      |
| Prilocaine: 4% plain      | 8.0 up to 600mg  | 545           | 7.6                      | 1.5                      | 22.7%      |
| Prilocaine: 4% w/ epinephrine | 8.0 up to 600mg | 545           | 7.6                      | 1.5                      | 22.7%      |
| Bupivacaine: 0.5% w/ epinephrine  
Note: Age > 12 y.o. | Total up to 90 mg | 90            | 10.0                     | 1.5                      | 22.7%      |

**Total %**  
0%
**Emergency Drugs**

- **50% Dextrose IV**: 25 g
- **Albuterol inhaled**: 90 mcg
- **Amiodarone IV (Code)**: 300 mg
- **Amiodarone IV (Tachycardia)**: 150 mg
- **Aspirin PO**: 325 mg
- **Atropine IV**: 0.5 mg
- **Diphenhydramine PO/IM/IV**: 50 mg
- **Ephedrine IM (Peds)**: 3 mg
- **Ephedrine IV (Adult)**: 10 mg
- **Epinephrine IM**: 0.3 mg
- **Epinephrine IV (Cardiac Arrest)**: 1 mcg
- **Epinephrine IV (Pre-pulse)**: 0.65 mcg
- **Fentanyl IV**: 25 mcg
- **Flumazenil IV (Adult)**: 0.5 mg

**Notes:**

- **Patient ID**: 150 lbs
- **60 kg**: Initial dose

### Additional Notes:

- **Additional Notes**:
  - **Notes**: 136 mg
<table>
<thead>
<tr>
<th>Emergency Drug</th>
<th>Expiration</th>
<th>Days Remaining</th>
<th>Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% Dextrose</td>
<td>04/30/2019</td>
<td>27</td>
<td>Hypoglycemia</td>
</tr>
<tr>
<td>Albuterol</td>
<td>04/01/2019</td>
<td>-2</td>
<td>Allergic Reaction, Asthma</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>04/10/2019</td>
<td>7</td>
<td>Tachycardia, Cardiac Arrest</td>
</tr>
<tr>
<td>Aspirin</td>
<td>04/09/2019</td>
<td>6</td>
<td>Chest Pain</td>
</tr>
<tr>
<td>Atropine</td>
<td>04/08/2019</td>
<td>5</td>
<td>Bradycardia, Hypotension</td>
</tr>
<tr>
<td>Diphenhydramine</td>
<td>04/01/2020</td>
<td>364</td>
<td></td>
</tr>
<tr>
<td>Ephedrine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epinephrine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epinephrine 1:10,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flumazenil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midazolam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naloxone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ondansetron</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Select a Provider Level

LEVEL I
Level I: General/specialty dentist using only local anesthesia or nitrous oxide/oral minimal/oral moderate sedation.

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Level II: General/specialty dentist can urgently initiate IV access but does not provide deep sedation/general anesthesia (provides IV moderate sedation routinely). Provider is current in BLS. May be current in ACLS and/or PALS.

LEVEL III
Level III: Dentist providing deep sedation/general anesthesia, Provider is current in BLS and ACLS and/or PALS.

Ten Minutes Saves A Life!

Societies
American Dental Society of Anesthesiology
American Society of Cerebral Anesthesia (ASCAC)
Patient Safety Foundation
American Society of Anesthesiology (ASA)
Society of Ambulatory Medicine
Society for Anesthesia
Society for Pediatric Sedation/Anesthesia Patient Safety Foundation
American Heart Association
Association of the US

Statements/Guidelines
ADA Guidelines For The Use of Sedation and General Anesthesia By Dentists
ADA Guidelines for Treating Pain Control and Sedation
ASA Statement on Sedation & Anesthesia Administration in Dental Office-Based Settings
Smart Tots Consensus Statement on the Use of Anesthetic and Sedative Drugs in Infants and Toddlers
FDA Drug Safety Communication: FDA review results in new warnings about using general anesthesia and sedation drugs in young children and pregnant women
ASA Continuum of Depth of Sedation: Definition of General Anesthesia and Levels of Sedation/Anesthesia
ASA Guidelines for Office-Based Anesthesia
Suggestions

Download the application on all phones and iPads

Have a designated iPad that is with the emergency kit (make sure it is charged)

Download the PDF to all computers

Print a copy of the PDF to have in the emergency kit (in case technology fails)

PRACTICE WITH YOUR STAFF
I am sure that this is one of the most significant projects of any dental organization in my career. We have, under the direction of Dean Raymond Cohlmia, made sure that every dental student, resident, dental hygiene student, and faculty member at OU College of Dentistry is aware of this free and potentially life-saving app, provided through the ADSA. It just made good sense to make sure each member of the ODA was also aware of it.

Not only is it an excellent quick reference guide in an emergency, but it is an excellent source to review critical moves and thought processes, periodically, and in a non-critical environment. We’ve added it to our simulation exercises in the Medical Emergencies in the Dental Office course.

Thanks for your note. And thanks to the ADSA on behalf of our profession and our patients…

Edmund Brady DDS, FACS, FAACS
Univ. of OK. College of Dentistry
Director: OMS Pre-Doc Studies and Clinics
Emergency Manuals Implementation Collaborative

Free Tools

EMERGENCY MANUAL: COGNITIVE AIDS FOR PERIOPERATIVE CRITICAL EVENTS

https://www.emergencymanuals.org

Contributors

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Paul Schwartz, DMD
Roy Stevens, DDS
### Drug Administration Emergency Management - Adult

<table>
<thead>
<tr>
<th>Drug</th>
<th>Administration</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Depression, Respiratory Soft Tissue Obstruction, Over Sedation</td>
<td>0.2 mg/kg IM (or 0.5 mg/kg IV)</td>
<td>Endotracheal intubation/palliative care/cannulated breathing bag</td>
</tr>
<tr>
<td>Bronchospasm</td>
<td>Albuterol</td>
<td>0.9 mg/kg IM (or 0.5 mg/kg IV)</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>Epinephrine</td>
<td>0.5-1 mg/kg IM (or 0.2 mg/kg IV)</td>
</tr>
<tr>
<td>Allergic reaction</td>
<td>Diphenhydramine</td>
<td>0.5 mg/kg IM (or 0.25 mg/kg IV)</td>
</tr>
<tr>
<td>Septic shock</td>
<td>Norepinephrine</td>
<td>0.1-0.5 mg/kg IM (or 0.1 mg/kg IV)</td>
</tr>
<tr>
<td>Blood pressure, Oxygen Saturation</td>
<td>Vasopressin</td>
<td>0.5-1 mg/kg IM (or 0.25 mg/kg IV)</td>
</tr>
<tr>
<td>Cardiac Arrest</td>
<td>Lidocaine</td>
<td>1 mg/kg IM (or 0.5 mg/kg IV)</td>
</tr>
<tr>
<td>Pain Control</td>
<td>Fentanyl</td>
<td>10 mcg/kg IM (or 2 mcg/kg IV)</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>Glucose</td>
<td>0.5 mg/kg IM (or 0.5 mg/kg IV)</td>
</tr>
<tr>
<td>Hypocalcemia</td>
<td>Calcium</td>
<td>10 mg/kg IM (or 2.5 mg/kg IV)</td>
</tr>
<tr>
<td>Acute Trauma &amp; Bleeding</td>
<td>Tranexamic acid</td>
<td>15 mg/kg IM (or 5 mg/kg IV)</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>Blood transfusion</td>
<td>7 mL/kg IM (or 2 mL/kg IV)</td>
</tr>
</tbody>
</table>

### Equipment Adult Medical Emergency Oxygenation, Ventilation, and Airway Management

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Adult AAR, BLS, ACLS training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen tank</td>
<td>500 mL / 15 minute supply</td>
</tr>
<tr>
<td>Oxygen regulator</td>
<td>2 liter flow rate</td>
</tr>
<tr>
<td>Face mask</td>
<td>N95 respirator</td>
</tr>
<tr>
<td>Nasal cannula</td>
<td>2 liter flow rate</td>
</tr>
<tr>
<td>Ventilator</td>
<td>Bag-valve-mask</td>
</tr>
<tr>
<td>Stethoscope</td>
<td>4 mm earpieces</td>
</tr>
<tr>
<td>IV fluid bags</td>
<td>1 liter each</td>
</tr>
<tr>
<td>Syringe pump</td>
<td>60 mL each</td>
</tr>
<tr>
<td>Blood pressure cuff</td>
<td>Small adult</td>
</tr>
</tbody>
</table>

### www.andreafonnerdds.com
Basic Life Support

Office Preparation: Staff Training (BLS)

Every staff member should maintain current Basic Life Support skills
- Ratio 30 compressions: 2 breaths (adult)
- Rate 100-120 compressions/minute
- Use of the AED/placement of AED pads

Training should be updated annually at a minimum

Be sure to certify new staff members
Washington State Law

WAC 246-817-720
Basic life support requirements.

Dental staff providing direct patient care in an in-office or out-patient setting must hold a current and valid health care provider basic life support (BLS) certification. Dental staff providing direct patient care include: Licensed dentists, licensed dental hygienists, licensed expanded function dental auxiliaries, certified dental anesthesia assistants, and registered dental assistants.

Newly hired office staff providing direct patient care are required to obtain the required certification within forty-five days from the date hired.

Washington State Law

WAC 246-817-722
Defibrillator.

(1) Every dental office in the state of Washington that administers minimal, moderate, or deep sedation, or general anesthesia, as defined in WAC 246-817-710, must have an automated external defibrillator (AED) or defibrillator.

(2) The dentist and staff must have access to the AED or defibrillator in an emergency, and it must be available and in reach within sixty seconds.

(3) A dental office may share a single AED or defibrillator with adjacent businesses if it meets the requirements in this section.
Automated External Defibrillator (AED)

- Turn on power
- Attach electrodes
- Operator “clears” the victim
- AED analyzes rhythm
Shockable rhythms

VENTRICULAR TACHYCARDIA
Impulses originate at ventricular pacemaker

Wide ventricular complexes. Rate > 120/min

VENTRICULAR FIBRILLATION
Chaotic ventricular depolarization

Rapid, wide irregular ventricular complexes

Administer a shock as indicated
Office Preparation: 
Staff Training

Adequate airway skills (use of the Bag Valve Mask)

**BEING ABLE TO VENTILATE A PATIENT CAN PREVENT A TRAGEDY IN YOUR OFFICE!**

**EVERYONE ON STAFF MUST HAVE THIS SKILL**
E-C clamp technique

The hand is positioned so that the little, ring, and middle fingers are spread over the mandible from the angle of the jaw forward towards the chin in the configuration of the letter "E". The jaw is then lifted, pulling the face into the mask. The thumb and forefinger are placed over the mask in the shape of the letter "C". The mask is squeezed onto the face and a seal is formed between the mask and the face.

Graphic 55539 Version 6.0
Office Preparation: Staff Training

- Basic knowledge of how to use the application or pdfs
- Discuss defined roles (cross trained)
- Practice as a team
- Location and content of emergency kit (including AED, O₂ and Manual of Emergency Protocols)

Emergency Kit

- Medications/Syringes
- Monitoring equipment/AED
- Portable oxygen tank with regulator and key
- Airway supplies
- Flashlight/batteries
- Manual of emergency protocols
- Emergency record/Pens
<table>
<thead>
<tr>
<th>Medication</th>
<th>#</th>
<th>Used For</th>
<th>Typical Dose</th>
<th>Syringe</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albuterol (inhaler) 90 mcg/puff</td>
<td>1</td>
<td>Bronchospasm</td>
<td>1-3 puffs</td>
<td>None</td>
<td>Shake and prime</td>
</tr>
<tr>
<td>Glucose</td>
<td>2</td>
<td>Hypoglycemia</td>
<td>Titrated to effect</td>
<td>None</td>
<td>orange juice, non-diet soda, glucose gel or tablets</td>
</tr>
<tr>
<td>Aspirin 325 mg/tab</td>
<td>1</td>
<td>Myocardial infarction</td>
<td>325 mg (1 tab chewed)</td>
<td>None</td>
<td>Must be nonenteric coated tablets; can also use 4 dissolvable tablets (81 mg)</td>
</tr>
<tr>
<td>Diphenhydramine 50 mg/mL; 1 mL</td>
<td>2</td>
<td>Allergic reaction</td>
<td>50 mg IM (1 mL)</td>
<td>1 mL</td>
<td>Can be given IV</td>
</tr>
<tr>
<td>Nitroglycerin 0.4 mg/tab (25/bottle)</td>
<td>1</td>
<td>Angina</td>
<td>0.4 mg (1 tab)</td>
<td>None</td>
<td>Can use a spray or tablets</td>
</tr>
<tr>
<td>Epinephrine (1:1000); pre-loaded, self-injecting syringe</td>
<td>2</td>
<td>Allergic reaction, severe asthma/bronchospasm, bradycardia</td>
<td>0.3 mg IM (Adult)</td>
<td>Medication comes with syringe</td>
<td>Pediatric dose is 0.15 mg</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<td>1-3 puffs</td>
<td>None</td>
<td>Shake and prime</td>
</tr>
<tr>
<td>Aspirin 325 mg/tab</td>
<td>4</td>
<td>Myocardial infarction</td>
<td>325 mg (1 tab chewed)</td>
<td>None</td>
<td>Must be nonenteric coated tablets; can also use 4 dissolvable tablets (81 mg)</td>
</tr>
<tr>
<td>Atropine 0.1 mg/mL; 10 mL</td>
<td>3</td>
<td>Bradycardia</td>
<td>0.5 mg (5 mL)</td>
<td>10 mL</td>
<td>Can buy the preloaded syringe; pay attention to the concentration you purchase!</td>
</tr>
<tr>
<td>50% Dextrose (25 gm); 50 mL</td>
<td>1</td>
<td>Hypoglycemia</td>
<td>Titrated-give slowly</td>
<td>20 mL</td>
<td>Or tube of glucose gel</td>
</tr>
<tr>
<td>Diphenhydramine 50 mg/mL; 1 mL</td>
<td>2</td>
<td>Allergic reaction</td>
<td>50 mg IV (1 mL)</td>
<td>1 mL</td>
<td>Can be given IM</td>
</tr>
<tr>
<td>Ephedrine 50 mg/mL; 1 mL</td>
<td>2</td>
<td>Hypotension</td>
<td>10 mg</td>
<td>5 mL</td>
<td>Dilute with 4 mL of fluid to make 10 mg/mL</td>
</tr>
<tr>
<td>Epinephrine (1:1000); pre-loaded, self-injecting syringe</td>
<td>2</td>
<td>Allergic reaction, severe asthma/bronchospasm, bradycardia</td>
<td>0.3 mg IM (Adult)</td>
<td>Medication comes with syringe</td>
<td>Pediatric dose is 0.15 mg</td>
</tr>
<tr>
<td>Flumazenil 0.1 mg/mL; 5 mL</td>
<td>4</td>
<td>Benzodiazepine reversal</td>
<td>0.2-0.5 mg IV (2-5 mL q min)</td>
<td>5 mL</td>
<td>IV ONLY; Titrated to effect; Can cause seizures</td>
</tr>
<tr>
<td>Naloxone 0.4 mg/mL; 1 mL</td>
<td>10</td>
<td>Opioid reversal</td>
<td>0.4 mg IV (1 amp)</td>
<td>1 mL</td>
<td>Titrated to effect; Can be given IM or IN (2 mg)</td>
</tr>
<tr>
<td>Nitroglycerin 0.4 mg/tab (25/bottle)</td>
<td>1</td>
<td>Angina</td>
<td>0.4 mg (1 tab)</td>
<td></td>
<td>Can use spray or tablets</td>
</tr>
</tbody>
</table>
Monitoring Equipment

Monitors

Blood Pressure/Pulse

Pulse Oximeter

Stethoscope

Glucometer

Automated External Defibrillator (AED)

Glucometer
5 steps for obtaining a BS
(1) alcohol wipe
(2) insert strip into monitor
(3) finger prick

(4) squeeze finger tip
(5) obtain blood specimen

Normal blood sugar range for healthy individuals

80 - 120 mg/dL
Supplies

Yankauer suction tip and tubing
Syringes (1 mL) * (1 mL, 5 mL, 10 mL, 20 mL)
Needles-20-gauge x 1” (at least 1”)
Alcohol wipes
Gauze/Tape/Band-aids
IV Fluid/Tubing/Catheters *

Airway Supplies
O₂ Supply With Regulator and Key

Face Mask and Nasal Cannula
Bag-Valve-Mask

DEMAND VALVE

Forces oxygen into the lungs AND into the stomach (40 LPM)

Cause gastric distention/vomiting

Pressure limit is set at 60cm H20

Over pressurization of the lungs and barotrauma
Flashlight/Batteries
## Review of Common Medical Emergencies in the Dental Office

<table>
<thead>
<tr>
<th>Emergency</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope</td>
<td>15,407</td>
</tr>
<tr>
<td>Allergy</td>
<td>2,583</td>
</tr>
<tr>
<td>Angina pectoris</td>
<td>2,552</td>
</tr>
<tr>
<td>Postural hypotension</td>
<td>2,475</td>
</tr>
<tr>
<td>Seizures</td>
<td>1,595</td>
</tr>
<tr>
<td>Acute asthma</td>
<td>1,392</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>1,326</td>
</tr>
<tr>
<td>Epinephrine reaction</td>
<td>913</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>890</td>
</tr>
</tbody>
</table>

Syncope / Sudden Altered/Lost Consciousness

Symptoms: Dizziness, light headedness, paleness, sweating, altered mental status, unconsciousness

**Actions**

1. Remove all objects from mouth
2. Call for in-office help
3. Place head down / legs raised
4. Assess ventilation

**Is the patient breathing?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

1. Ensure adequate ventilation and oxygenation during recovery
2. Regained consciousness within two (2) minutes?

**Does the patient have a pulse?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

1. Administer 100% oxygen
2. Observe
3. Cold compress to forehead
4. Call 911
5. Assist ventilation as needed
6. Check pulse if no pulse

- 2-S Cardiac Arrest
- 3-5 Seizure
- 5-2 Bradycardia
- 3-3 Stroke
- 3-4 Hypoglycemia
Allergic Reaction/Anaphylaxis

Diphenhydramine
(50 mg-PO/IV/IM)
Epinephrine

Non-selective agonist of adrenergic receptors

- Alpha-1, Beta-1, Beta-2
- 1:10,000 for IV use (0.1mg/mL)
- 1:1,000 for IM use (1mg/mL)
Epinephrine 1:1000
(0.3 mg IM-adult; 0.15 mg IM-child)
Epinephrine 1:1000 (1mg/ml)
(0.3 mg IM)

Cardiac
Chest Pain: Angina

Acute subternal crushing chest pain or pressure which may radiate to either arm or jaw, BP decreased or elevated, shortness of breath, cyanosis, sweating (Patient not sedated or in minimal/moderate sedation with above complaints)

**Actions**

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consider nitroglycerin</td>
<td>1. Call 911</td>
</tr>
<tr>
<td>2. Titrate 100% oxygen</td>
<td>2. Retrieve AED</td>
</tr>
<tr>
<td>3. Monitor ECG</td>
<td>3. Titrate 100% oxygen</td>
</tr>
</tbody>
</table>
| | 4. Administer aspirin  
  *confirm no allergy, see reference* |
| 1. | 5. Consider opioid for pain relief |
| | 6. Be prepared to begin CPR |

**Adult Emergency Drug Therapy**

- **Nitroglycerin** PO:
  - Spray: 1-2 SL q5m PRN (0.4mg per actuation)
  - Tab: 0.4mg SL q5m
  - MAX: 3 doses within 15 min
- **Aspirin** PO:
  - 325 mg – or – four 81 mg tablet
  - NOTE: chew then swallow
- **Oxygen**:
  - Titrate O₂ saturation ≥ 94%
- **Fentanyl IV**:
  - 25 – 50 mcg
Nitroglycerin (1 tablet or spray)

Chest Pain: Myocardial Infarction
Chest Pain (Acute Coronary Syndrome / Angina / Myocardial Infarction)

Acute substernal crushing chest pain or pressure which may radiate to either arm or jaw, BP decreased or elevated, shortness of breath, cyanosis, sweating
(Patient not sedated or in minimal/moderate sedation with above complaints)

**Actions**

- History of angina with typical chest pain?
  - YES
  - NO

1. **Consider nitroglycerin**
2. **Titrated 100% oxygen**
3. **Monitor ECG**

   - Resolved within five (5) min?
     - YES
     - NO

1. **Decide clinical course**
   - or -
   - Call 911 for transport

   1. **Call 911**
   2. **Retrieve AED**
   3. **Administer aspirin**
      - confirm no allergy, see reference
   4. **Consider opioid for pain relief**
   5. **Be prepared to begin CPR**

---

**Adult Emergency Drug Therapy**

<table>
<thead>
<tr>
<th>Nitroglycerin PO:</th>
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<td>Spray: 1-2 SL q5m PRN (0.4mg per actuation)</td>
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<tr>
<td>Tab: 0.4mg SL q5m</td>
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<td>MAX: 3 doses within 15 min</td>
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<th>Aspirin PO:</th>
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</thead>
<tbody>
<tr>
<td>325 mg – or – four 81 mg tablet</td>
</tr>
</tbody>
</table>

**Oxygen:**

Titrated O₂ saturation ≥ 94%

**Fentanyl IV:**

25 – 50 mcg

---

Aspirin

(1 tablet chewed then swallowed)
Aspirin
(1 tablet chewed then swallowed)

Postural Hypotension
Seizure

Convulsions, blank stare, unaware of surroundings

**ACTIONS:**

1. Remove all objects from mouth
2. Place in supine position
3. Protect the patient from physical harm
   - lightly restrain
   - provide padding
4. Administer 100% oxygen, assist / control ventilation as needed
5. Administer benzodiazepine

Has the patient regained consciousness within 2 minutes?

Yes

No

1. **Call 911**

**Emergency Drug**

<table>
<thead>
<tr>
<th>Initial dose</th>
<th>150 lbs</th>
<th>68 kgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam IN</td>
<td>10 mg</td>
<td>info</td>
</tr>
<tr>
<td>Midazolam IV/IM</td>
<td>5 mg</td>
<td>info</td>
</tr>
</tbody>
</table>
Bronchospasm/
‘Asthma attack’

Asthma / Bronchospasm
Wheezing, difficulty breathing, increased respiratory effort

**ACTIONS**
1. Administer 100% oxygen
2. Administer albuterol
3. Auscultate lungs
4. If unresolved, Call 911
5. Administer IM epinephrine additional doses may be necessary
6. Reverse sedative drugs

<table>
<thead>
<tr>
<th>Emergency Drug</th>
<th>150 lbs</th>
<th>68 kgs</th>
<th>initial dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albuterol Inhaled</td>
<td>90 mcg</td>
<td>info</td>
<td></td>
</tr>
<tr>
<td>Flumazenil IV (Adult)</td>
<td>0.5 mg</td>
<td>info</td>
<td></td>
</tr>
<tr>
<td>Flumazenil IV (Peds)</td>
<td>0.5 mg</td>
<td>info</td>
<td></td>
</tr>
<tr>
<td>Naloxone IV/IM</td>
<td>2 mg</td>
<td>info</td>
<td></td>
</tr>
<tr>
<td>Epinephrine IM</td>
<td>300 mcg</td>
<td>info</td>
<td></td>
</tr>
</tbody>
</table>
Albuterol (1 puff q 15 seconds)  
Make sure to shake and prime

Hyperventilation
Hypoglycemia
Hypoglycemia / Low Blood Sugar

Sweaty, dizzy, pale, disoriented, rapid heart rate, confusion
Most likely to occur in diabetic patients

**ACTIONS**

<table>
<thead>
<tr>
<th>Is the patient conscious?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>

1. Administer sugar containing product or IV dextrose
2. Call 911
3. Administer IV Dextrose
4. Ensure ventilation and oxygenation
5. BLS as indicated

Emergency Drug

50% Dextrose IV

150 lbs 68 kgs

Initial dose 25 g
50% Dextrose
(Titrated slowly-IV Only)

Local Anesthetic Toxicity
Signs & Symptoms of Local Anesthetic Toxicity

Agitation
Confusion
Slurred speech
Drowsy/unconscious
Seizure activity
Respiratory arrest
Cardiopulmonary collapse
Stroke

STROKE is an Emergency. Every minute counts. ACT F.A.S.T!

**FACE**
Does one side of the face droop? Ask the person to smile.

**ARMS**
Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?

**SPEECH**
Is speech slurred? Ask the person to repeat a simple sentence. Is the sentence repeated correctly?

**TIME**
If the person shows any of these symptoms, Call 911 or get to the hospital immediately.
Sedation
Related Complications
Because sedation is a *continuum*, it is not always possible to predict how an individual patient will respond.

Sedation Is A Continuum

<table>
<thead>
<tr>
<th>Responsiveness</th>
<th>Minimal sedation</th>
<th>Moderate sedation</th>
<th>Deep sedation</th>
<th>General anesthesia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Responds normally to verbal command</td>
<td>Responds <em>purposefully</em> to verbal command/light touch</td>
<td>Responds <em>purposefully</em> following repeated or painful stimulation</td>
<td>No response, even to pain</td>
</tr>
<tr>
<td>Airway</td>
<td>Maintained</td>
<td>Maintained</td>
<td>May require airway support</td>
<td>Requires support</td>
</tr>
<tr>
<td>Spontaneous ventilation</td>
<td>Maintained</td>
<td>Maintained</td>
<td>May require ventilatory support</td>
<td>Requires support</td>
</tr>
<tr>
<td>Cardiovascular function</td>
<td>Maintained</td>
<td>Maintained</td>
<td>Usually maintained</td>
<td>May be impaired</td>
</tr>
</tbody>
</table>
Airway Obstruction
(secondary to sedation)

Soft Tissue Obstruction
Airway Obstruction: Treatment

- Lighten sedation
- Turn off N\textsubscript{2}O
- Stop all central nervous system depressants

Head Tilt/Chin Lift

Jaw Thrust

Consider reversal agents

Head Tilt-Chin Lift
Respiratory Depression

Respiratory Depression: Treatment

- 100% oxygen (turn off N₂O)
- Stimulate patient
  - Ask the patient to take a deep breath!
- Be prepared to perform positive pressure ventilation
- Consider reversal agents
Oversedation/Apnea

**ACTIONS**

1. Administer 100% Oxygen
2. Remove all objects from mouth
3. Suction airway
4. Triple airway maneuver and assess ventilation (e.g., chest rise, EtCO₂ pulse oximeter)

<table>
<thead>
<tr>
<th>Is patient ventilating &amp; oxygenating?</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
</tr>
<tr>
<td>1. Allow patient to return to moderate sedation (responsiveness) or reverse sedative</td>
</tr>
<tr>
<td>2. If no reversal agents administered, and patient is still unresponsive after 5 minutes, reverse sedative agents</td>
</tr>
<tr>
<td>3. If patient does not respond to reversal agents, Call 911</td>
</tr>
<tr>
<td>4. Assure ventilation and oxygenation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Call 911</td>
</tr>
<tr>
<td>2. Two (2) person bag-valve-mask</td>
</tr>
<tr>
<td>3. Insert oral airway and resume bag-valve-mask with triple airway maneuver</td>
</tr>
<tr>
<td>4. Insert LMA</td>
</tr>
<tr>
<td>5. Reverse sedative drugs</td>
</tr>
<tr>
<td>6. Rule out:</td>
</tr>
<tr>
<td>1-5 Foreign Body</td>
</tr>
<tr>
<td>1-7 Laryngospasm</td>
</tr>
<tr>
<td>1-3 Asthma / Bronchospasm</td>
</tr>
<tr>
<td>1-2 Aspiration</td>
</tr>
<tr>
<td>Flumazenil IV (Adult) 0.5 mg/kg</td>
</tr>
<tr>
<td>Flumazenil IV (Peds) 0.5 mg/kg</td>
</tr>
<tr>
<td>Naloxone IV/IM 0.4 mg/kg</td>
</tr>
</tbody>
</table>
Bag-Valve-Mask
(sometimes called a BVM or Ambu bag)
Foreign Body/
Airway Obstruction

Choking / Foreign Body Airway Obstruction

Partial airway obstruction - rasping, wheezing, coughing
Total airway obstruction - no air movement leading to cyanosis and unconsciousness

ACTIONS
1. Sit the patient upright
2. Encourage coughing
3. If unable to cough or speak,
   administer uninterrupted abdominal thrusts until object is retrieved or patient becomes unresponsive
   (chest thrust for obese/pregnant patient)
   No blind finger sweep
4. Call 911
5. Reverse sedation as soon as possible;
   Minimize interruption of abdominal thrusts
6. If patient becomes unresponsive,
   Chest compression x 30
7. Look in mouth for object and remove if visible
8. Continue CPR
Practice, Practice, Practice!!!