Medical emergencies CAN and DO happen in the practice of dentistry.
### Syncope
- 15,407 (50.3%)

### Mild allergy
- 2,583 (8.4%)

### Angina Pectoris
- 2,552 (8.3%)

### Postural hypotension
- 2,475 (8.1%)

### Seizure
- 1,595 (5.2%)

### Asthmatic attack
- 1,392 (4.5%)

### Hyperventilation
- 1,326 (4.3%)

### Epinephrine Rxn
- 913 (3.0%)

### Hypoglycemia
- 890 (2.9%)

### Cardiac Arrest
- 331 (1.1%)

### Anaphylaxis
- 304 (1.0%)

### Myocardial Infarction
- 289 (0.9%)

### L.A. Overdose
- 204 (0.7%)

---

### Medical Emergencies Stage of Treatment

<table>
<thead>
<tr>
<th>Treatment Stage</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately before Tx</td>
<td>1.5%</td>
</tr>
<tr>
<td>During or after local</td>
<td>54.9%</td>
</tr>
<tr>
<td>During treatment</td>
<td>22%</td>
</tr>
<tr>
<td>After treatment</td>
<td>15.2%</td>
</tr>
<tr>
<td>After leaves office</td>
<td>5.5%</td>
</tr>
</tbody>
</table>
Medical Emergencies
Treatment being performed

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tooth extraction</td>
<td>38.9%</td>
</tr>
<tr>
<td>Pulp extirpation</td>
<td>26.9%</td>
</tr>
<tr>
<td>Unknown</td>
<td>12.3%</td>
</tr>
<tr>
<td>Other treatment</td>
<td>9%</td>
</tr>
<tr>
<td>Preparation</td>
<td>7.3%</td>
</tr>
<tr>
<td>Filling</td>
<td>2.3%</td>
</tr>
<tr>
<td>Incision</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

LEGAL / MORAL obligation of Healthcare Providers in emergency management

Keep the victim alive until:
- Recovery occurs or
- Help arrives to take over management

Preparation of the Office & Staff

1. Basic Life Support training
2. Preparation of Dental Office Staff Members
3. Emergency Assistance
4. Emergency Drugs & Equipment

BASIC LIFE SUPPORT
(CPR, Resuscitation, Reanimation)
is THE single-most important step in the management of ALL medical emergencies
The HEART is a PUMP

What happens when the heart stops PUMPING blood?

Blood pressure falls to zero
Pulse is not palpable
Consciousness is lost
Respirations cease

DEAD
UNCONSCIOUS
NO PULSE
NO BREATHING
DEAD
In the absence of any treatment, death is a certainty.

Doing ‘something’ gives the victim a chance at survival.

At the moment the heart stops pumping, circulation of blood ceases.
- The victim ‘looks’ dead
- They are “CLINICALLY” DEAD
- Clinical death may be reversible

The goal of resuscitation is to prevent the PERMANENT death of the victim.
- Cells in the victims body will die when they use up all of the O₂ available to them
- BIOLOGICAL or CELLULAR death occurs
- Biological death is irreversible
The time between the occurrence of **CLINICAL and BIOLOGICAL DEATH** represents the period in which **RESUSCITATION** may be successful.

AHA Guidelines relate primarily to **Sudden Cardiac Arrest** - fortunately a rare event in the dental environment. Cardiac arrest occurs when the heart stops **PUMPING** blood, not - as some believe - when the heart stops **BEATING**.
EMERGENCY MANAGEMENT ALGORITHM

P - C - A - B - D

Algorithm for ALL emergency management

At any given moment in your cardiovascular system:

- 65% of blood is in the venous circulation
- 5% of blood is in capillaries
- 30% of blood is arterial

Continued emphasis has been placed on high-quality CPR:

- Chest compressions of adequate rate and depth,
- Allowing complete chest recoil after each compression,
- Minimizing interruptions in compressions, and
- Avoiding excessive ventilation.

So, Why the change in the algorithm?

At the moment the heart stops pumping circulation of blood ceases

- the 5% of blood found in capillaries will keep cells alive for a few minutes, depending upon that cells metabolic rate
Preventing Biological Death

- At the moment when blood flow ceases (cardiac arrest occurs) cells still have O\textsubscript{2} available (5% capillaries) and will remain alive until they use it up - then cellular death occurs.
- Cells with lower metabolic rates will survive longer
- Cells with higher metabolic rates will die faster

Neurons deprived of O\textsubscript{2} (anoxia) for approximately 3 minutes will demonstrate degrees of permanent damage.

Arteries deliver oxygenated blood to capillaries.
- 30% of blood volume is found in arteries
- The new algorithm implies “Use up the O\textsubscript{2} in the arterial blood which is ‘sitting’ just a short distance away from capillaries before we ventilate.”

BASIC LIFE SUPPORT (CPR, Resuscitation, Reanimation) is THE single-most important step in the management of ALL medical emergencies.
Preparation of the Office & Staff

1. Basic Life Support training
2. Preparation of Dental Office Staff Members
3. Emergency Assistance
4. Emergency Drugs & Equipment

Member #1
• 1st person on scene of emergency
  
  ◦ Stay with victim; yell for ‘HELP’
  ◦ Administer BLS, as needed

The DOCTOR
• Need NOT be the person ‘rescuing’ the victim.

  ◦ Duties CAN be delegated, however . . .
  ◦ the doctor is ultimately responsible for the actions of staff members

Member #2, on hearing call for HELP . . .

Obtains:
• 1. Emergency drug kit;
• 2. Portable O₂ cylinder; and
• 3. AED

  • . . . bringing them to site of emergency
Members #3, #4 and on . . .
Assigned ancillary tasks such as:

- Monitoring vital signs (BP, heart rate & rhythm)
- Assist with basic life support
- Activate EMS
- Hold elevator in lobby while awaiting arrival of EMS
- Prepare emergency drugs for administration.
- Keep written time line record during emergency

TEAM Approach - Hospital

Idea

- Laminated cards for each member of the TEAM
- Listing duties during emergency

Preparation of the Office & Staff

1. Basic Life Support training
2. Preparation of Dental Office Staff Members
3. Emergency Assistance
4. Emergency Drugs & Equipment
EMS Services

When the DOCTOR or other PERSON IN CHARGE feels it is necessary

NEVER HESITATE to seek help if you feel it is needed

When?

911

Preparation of the Office & Staff

1. Basic Life Support training
2. Preparation of Dental Office Staff Members
3. Emergency Assistance
4. Emergency Drugs & Equipment

Emergency drugs & equipment USA

Numerous specialty organizations (AAP, AAOMS, AAPD, AGD) have developed Guidelines for their members and other dentists practicing that specialty.
IF the doctor utilizes:

GENERAL ANESTHESIA
PARENTERAL SEDATION (IM, IV, IN)
ORAL SEDATION

Individual States have Regulations requiring a predetermined list of EMERGENCY DRUGS & EQUIPMENT

**Critical drugs & equipment**

THE BASIC SEVEN

**Emergency drugs & equipment USA**

**Advantage:** Convenience; Drug updates
**Disadvantage:** Complacency; $ $ $
Epinephrine (Adrenaline)

- Single most important drug in emergency medicine

Epinephrine

- 1:1,000 AND 1:2,000
  - Autoinjector
  - 1:2,000 up to 30 kg weight
  - 1:1,000 if more than 30 kg

- INDICATION: Anaphylaxis
- CONTRAINDICATIONS: None

Histamine-Blocker

- Diphenhydramine HCl injectable
  - Benadryl
  - 50 mg/mL

- INDICATION: Anaphylaxis, Mild Allergy
- CONTRAINDICATIONS: None

Bronchodilator

Albuterol

- Proventil, Ventolin, ProAir
- Bronchospasm (asthma)
- NO CONTRAINDICATIONS
- Spacer recommended for younger patients
Coronary artery **VASODILATOR**

**Nitroglycerin**
- Nitrolingual spray (USD$200+)
- Nitrostat sublingual tablets (USD$50/100tabs)
- 0.4 mg/dose
- **INDICATION:** Angina pectoris; Prehospital management of cardiac pain
- **CONTRAINDICATION:**
  - Hypotension

**Antihypoglycemic**
- Non-diet soft drink
- Orange juice
- Tube of concentrated glucose
  - InstaGlucose For oral administration
- **INDICATION:** Hypoglycemia
- **CONTRAINDICATION:** Unconsciousness

**Thrombolytic**

**Aspirin (ASA)**
- 325 mg
- Powdered or Chewable
- **INDICATION:** Suspected myocardial infarction
- **CONTRAINDICATION:** Allergy

**Oxygen**

*The 2nd most important drug in emergency medicine*
Oxygen

- ‘E’ cylinder + delivery system
- INDICATION: Any medical emergency
- CONTRAINDICATION: None *

* Hyperventilation

Equipment

- Disposable face masks (pediatric & adult for ventilation with supplemental O₂)

Equipment

- Automated External Defibrillator (ED)

Why YOU want 2 AED’s

Sudden Cardiac Arrest

- 70% of out-of-hospital SCA occur in the HOME of the victim.
- As dentists we have TWO homes:
  - The one in which we live
  - The one in which we work
Automated External Defibrillator

- Defibrillation has been a component of Healthcare Provider Basic Life Support since 2000
- Survival from Out-Of-Hospital Sudden Cardiac Arrest is related to the elapsed time from collapse of the victim to defibrillation

- 44 of 50 states in the USA mandate successful BASIC LIFE SUPPORT training to maintain DENTAL LICENSURE
- 12 states (as of December 2013) mandate presence of an AED on-site
  - Florida, Colorado, Arkansas, Georgia, Louisiana, Massachusetts, Michigan, Maryland, Tennessee, North Carolina, West Virginia, and Wisconsin

Note

The doctor is expected to be knowledgeable of, and able to use, any drug or piece of emergency equipment contained in the emergency kit.

BASIC MANAGEMENT of MEDICAL EMERGENCIES

EMERGENCY MEDICINE
CONSCIOUS
- responds to sensory stimulation (e.g. “shake & shout”)
- blood flow to brain is (minimally) adequate
- ANY POSITION the victim desires is appropriate

UNCONSCIOUS
- lack of response to sensory stimulation (e.g. “shake & shout”)
- < blood flow to brain most common cause of unconsciousness
- SUPINE with feet elevated slightly
  - increases blood flow to brain
  - does NOT compromise breathing
P - Position

- UNCONSCIOUS
  - Lack of response to sensory stimulation (e.g. “shake & shout”)
  - Quickly assess for presence of respiratory efforts & circulation
    - If NO then immediately start C-A-B sequence
    - If YES then continue with A-B

C - Circulation

- UNCONSCIOUS
  - Palpate peripheral pulse: CAROTID recommended [adult]
  - Palpate peripheral pulse: BRACHIAL recommended [child]
  - Palpate with index / middle fingers; NOT thumb
  - Not more than 10 seconds
  - If NO pulse or QUESTIONABLE pulse, begin CHEST COMPRESSION

- CONSCIOUS
  - responds to sensory stimulation (e.g. “shake & shout”)
  - blood flow to brain is (minimally) adequate
  - peripheral pulse WILL be palpable (e.g. radial, brachial, carotid)
  - Assisted circulation (e.g. chest compression) is NOT necessary
A - Airway

CONSCIOUS
- If patient can speak:
  - Airway is open, breathing is, at minimum, adequate
  - Airway management is NOT necessary

UNCONSCIOUS - breathing & pulse
- Skeletal muscles RELAX with LOC
- Tongue (a large skeletal muscle) falls back into airway
- Tongue is the PRIMARY cause of airway obstruction
- HEAD TILT - CHIN LIFT

B - Breathing
B - Breathing

CONSCIOUS

- If patient can speak:
  - Airway is open, breathing is, at minimum, adequate

- Ventilation is NOT necessary

UNCONSCIOUS - respiratory efforts & pulse

- “Look, Listen, Feel” = No longer recommended by AHA

- Quick evaluation of breathing.

UNCONSCIOUS - Respiratory efforts & pulse

- See chest rise does NOT mean patient is breathing
  - Breathing is exchange of air
  - Chest rise means victim is TRYING to breath
  - Airway may be obstructed (tongue, foreign body) and chest will still rise.

UNCONSCIOUS - Pulse, no respiratory efforts

- In absence of spontaneous respiratory efforts (e.g. chest not rising), ventilation is necessary:
  - 2 full ventilations, seeing chest rise with each
  - Maintain head tilt - chin lift
  - Seal nose
P - C - A - B
Keep the victim alive
Ensuring that the victim's BRAIN is receiving an adequate supply of blood that contains OXYGEN

D - Definitive Care

Management of Specific Medical Emergencies

Altered Consciousness
Respiratory Distress
Drug-Related Emergencies
Chest ‘Pain’
Deprivation of blood, O₂ or sugar produces alterations in CNS functioning:
- Altered consciousness
- Unconsciousness

The brain requires a constant supply of blood containing both oxygen and glucose in order to function properly.

Percentages of Cardiac Output Distributed to Different Organ Systems

<table>
<thead>
<tr>
<th>Region</th>
<th>% of CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney</td>
<td>22</td>
</tr>
<tr>
<td>GI system, Spleen</td>
<td>21</td>
</tr>
<tr>
<td>Skeletal Muscle</td>
<td>15</td>
</tr>
<tr>
<td>Brain</td>
<td>14</td>
</tr>
<tr>
<td>Skin</td>
<td>6</td>
</tr>
<tr>
<td>Liver</td>
<td>6</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Myocardium</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
</tr>
</tbody>
</table>

Hyperglycemia

Diabetes mellitus
Most likely candidate for HYPOGLYCEMIA = Type 1 Diabetic

Hypoglycemia

Type 1
Less common
Juvenile onset
Severe
Insulin - all

Type 2
More common
Adult onset
Mild
Insulin - 20% - 30%

Will NOT be an acute medical emergency in the dental office environment
Hypoglycemia

- 2nd leading cause of loss of consciousness
- 1st is HYPOTENSION (low blood pressure)
  - Decreased O₂
  - Decreased ‘sugar’

Hypoglycemia

- Can happen to anyone but ...
- Most likely to occur in a type 1 diabetic
  - IDDM
  - ‘J uvenile onset’

Causes of HYPOGLYCEMIA in diabetic patients

<table>
<thead>
<tr>
<th>Cause</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate food (carbohydrate intake)</td>
<td>66</td>
</tr>
<tr>
<td>Excessive insulin dose</td>
<td>12</td>
</tr>
<tr>
<td>Sulfonylurea therapy</td>
<td>12</td>
</tr>
<tr>
<td>Streptococcal infection</td>
<td>4</td>
</tr>
<tr>
<td>Ethanol intake</td>
<td>4</td>
</tr>
<tr>
<td>Other (Kidney failure, liver failure, decrease in corticosteroid dose)</td>
<td>2</td>
</tr>
</tbody>
</table>

Determine if ...

- Patient has eaten recently
- Taken insulin recently
- Consider administering “sugar”
### Hypoglycemia

**Classic S&S**
- Cold (moist skin)
- Sweating (diaphoresis)
- Tremor (shaking)
- Mentally disoriented (< CNS)

**P . . .**
- Conscious

**C . . .**
- A . . .
- B . . .
- D . . .

---

**Hypoglycemia**

Administer ‘sugar’
- Glucose gel
- Fruit juices
  - Orange preferred by many
- Hard candy
- Soft drinks [non-diet]

---

<table>
<thead>
<tr>
<th>Decreasing blood glucose levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ 50</td>
</tr>
<tr>
<td>~ 30 - 20</td>
</tr>
<tr>
<td>&lt; 20</td>
</tr>
</tbody>
</table>
Hypoglycemia - unconscious

P . . .
C . . .
A . . .
B . . .
D . . .

P . . . Supine
   ◦ To increase blood flow to brain
C . . . Pulse present, BP ‘normal’
A . . . Head tilt - chin lift necessary
B . . . Spontaneous ventilation present

Hypoglycemia - unconscious


At this juncture we have ruled out:
   ◦ Syncope (fainting) and
   ◦ Cardiac arrest

Hypoglycemia - unconscious


Do we know what the cause of LOC is?
   ◦ If NO . . . activate EMS
Hypoglycemia - unconscious


Do we know what the cause of LOC is?

If YES, but cannot treat . . . activate EMS

D . . . Do not put anything that might liquefy in the mouth of an unconscious patient

Definitive management:

50% or 25% Dextrose [30 ml] IV
1 mg glucagon IV or IM
Seizure
Convulsion, ‘Fit’

Definition:
A paroxysmal episode, caused by abnormal electrical conduction in the brain, resulting in the abrupt onset of transient neurologic symptoms such as involuntary muscle movements, sensory disturbances and altered consciousness. Also called convulsion.

Seizures
ALTERED CONSCIOUSNESS

Damaged cells
What happens to cells when they are DEAD?
NOTHING - they are dead

Damaged cells
What happens to cells when they are DAMAGED?
**Damaged cells**

When cells are damaged, hypoxic or anoxic, they become *hyperexcitable*

- Ingrown nail = an ‘OWIE’
- Bronchi = BRONCHOSPASM
- Myocardium = DYSRHYTHMIAS

---

**Causes of seizures in the dental environment**

- Epileptic patients
  - Stress induces seizures
- Cerebral hypoxia
  - Syncope + inadequate airway
- Hypoglycemia
- Local anesthetic overdose

---

**Seizures - Dialogue history**

- What type of seizure(s) do you have?
- What anticonvulsant medications do you take?

Grand Mal - French for ‘Great Illness’
Seizures - Dialogue history

- What type of seizure do you have?
- What anticonvulsant medications do you take?
- How well controlled are your seizures?
- What is your aura?
  - Generalized tonic-clonic

Epileptic AURA

- An epileptic aura precedes an epileptic seizure and may involve visual disturbances, dizziness, numbness, or any of a number of sensations which the patient may find difficult to describe exactly.

Epileptic AURA

- In epilepsy the aura serves a useful purpose in that it warns of an impending attack and gives the patient time to seek privacy and a safe place to lie down before the seizure actually begins.

Seizure management

Tonic phase

Clonic phase
Seizure management

Remove any/all items of dental equipment from the patient's mouth

Prepare the patient for the seizure:
  - Remain in dental chair
  - Loosen tight clothing

Generalized tonic clonic seizure
GTCS, ‘Grand Mal’

- Are self-limiting
- (most) SEIZURES STOP
- Last not more than 2 to 5 minutes
- Do NOT require anticonvulsant therapy
- Do NOT result in injury

Generalized tonic clonic seizure
GTCS, ‘Grand Mal’

- In a generalized tonic clonic seizure . . .
- During the *ictal* phase:
  - CNS stimulation Bad
  - Respiratory stimulation OK
  - Cardiovascular stimulation So-So

Ictal refers to a physiologic state or event such as a seizure. The word originates from the Latin ictus, meaning a blow or a stroke. In electroencephalography (EEG), the recording during an actual seizure is said to be "ictal". There are four ictal states which include pre-ictal, ictal, post-ictal, and inter-ictal. Pre-ictal refers to the state immediately before the actual seizure, stroke, or headache, though it's recently come to light that some of the characteristics of this stage (such as visual auras) are actually the beginnings of the ictal state. Post-ictal refers to the state shortly after the event. Inter-ictal refers to the period between seizures, or convulsions.
In a generalized tonic clonic seizure . . .
During the *ictal* phase:
- CNS stimulation  
  Bad
- Respiratory stimulation  OK
- Cardiovascular stimulation  So-So

Protect victim from injury:
Rescuer 1: arms . . . gently!
Rescuer 2: legs . . . gently!
Rescuer 3: airway
remove “pillow” or “donut”
from headrest of chair
↓
Summon EMS ?????
Seizure management

- In a generalized tonic clonic seizure...
- During the *post-ictal* phase:
  - CNS depression  Bad
  - Respiratory depression  Bad
  - Cardiovascular depression  Bad

Post-ictal phase

Reassess:  

P . . .
C . . .
A . . .
B . . .
D . . .

The postictal state is the altered state of consciousness that a person enters after experiencing a seizure. It usually lasts between 5 and 30 minutes, but sometimes longer in the case of larger or more severe seizures and is characterized by drowsiness, confusion, nausea, hypertension, headache or migraine and other disorienting symptoms. Additionally, emergence from this period is often accompanied by amnesia or other memory defects. It is during this period that the brain recovers from the trauma of the seizure.
Post-ictal phase

- CAB as needed
  - Airway, if snoring
  - Breathing, circulation - usually not necessary
  - Patient is disoriented, sleeping
- Position: turn on side, if at all possible
  - Minimizes risk of aspiration of vomitus
  - Aids in airway maintenance,
- Dental chair: turn on side, if at all possible
  - If not: Supine & maintain airway prn

Why consider EMS?

Determine disposition of patient following seizure:
- Hospitalization, if not oriented to space & time:
  - Where are you?
  - What day is it?
- Discharge home in company of companion if oriented to space and time
Management of status epilepticus

GTCS (Grand mal) status

Status epilepticus is defined as:

A medical emergency characterized by continuous seizures lasting more than 30 minutes without interruption. Status epilepticus can be precipitated by the sudden withdrawal of anticonvulsant drugs, inadequate body levels of glucose, a brain tumor, a head injury, a high fever, or poisoning.

Management of Grand Mal Status

- Terminate dental procedure
- Position patient
- Activate EMS
- Protect patient from injury
- BLS, prn
- Administer oxygen
- Monitor vital signs
Management of Grand Mal Status

EMS
- Venipuncture (adult or larger child [> 30 kg])
- Anticonvulsant drug - titrated to effect IV
- Administer 50% dextrose

Definitive management:
- Stabilize & transport to hospital ED

Management of Grand Mal Status

EMS
- Smaller pediatric patient (< 30 kg)
- Anticonvulsant drug - 0.2 mg/kg IN
- Administer 25% dextrose

Definitive management:
- Stabilize & transport to hospital ED

GTCS (Grand mal) status

Administer anticonvulsants:
- Administered IV or IN
- IV benzodiazepines:
  - Midazolam

Unconsciousness

Lack of response to sensory stimulation
Unconsciousness

Etiologies
- Drop in blood pressure
  - Lack of blood/oxygen ... syncope
  - Lack of sugar ... hypoglycemia
  - Postural hypotension
- Seizures
- CNS depressant overdose
- Local anesthetic overdose
- Cardiac arrest
- Anaphylaxis
- Cerebrovascular accident

Syncope

Vasodepressor syncope, Vasovagal syncope, Common faint

Presyncope

- ‘Fight or flight’ response to stress:
  - > blood flow to arms + legs
- If patient moves:
  - Muscle contraction
  - Blood returns to heart
  - Cerebral blood flow maintained
- If patient remains still:
  - Decreased blood return to heart
  - Decreased cardiac output
Presyncope

- Decreased cardiac output
- Decreased blood pressure (hypotension)
- Decreased cerebral circulation:
  - Diminished CNS functioning
  - S&S of ‘feeling faint’

Presyncope

- Decreased BP and cerebral blood flow lead to . . .
- Reflex increase in heart rate [tachycardia] resulting in . . .
- Transient maintenance of adequate blood pressure
  - Low, but near baseline

Presyncope - S&S

<table>
<thead>
<tr>
<th>EARLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling of warmth</td>
</tr>
<tr>
<td>Loss of color; pale or ashen-gray skin tone</td>
</tr>
<tr>
<td>Heavy perspiration</td>
</tr>
<tr>
<td>Reports of “feeling bad” or “feeling faint”</td>
</tr>
<tr>
<td>Nausea</td>
</tr>
<tr>
<td>Blood pressure at baseline level or slightly lower</td>
</tr>
<tr>
<td>Tachycardia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pupillary dilation</td>
</tr>
<tr>
<td>Yawning</td>
</tr>
<tr>
<td>Hyperpnea</td>
</tr>
<tr>
<td>Cold hands and feet</td>
</tr>
<tr>
<td>Hypotension</td>
</tr>
<tr>
<td>Bradycardia</td>
</tr>
<tr>
<td>Visual disturbances</td>
</tr>
<tr>
<td>Dizziness</td>
</tr>
<tr>
<td>Loss of consciousness</td>
</tr>
</tbody>
</table>

Presyncope Management

- Position patient supine
- Increase blood pressure
- Maintain cerebral circulation
- Administer O₂
- Administer aromatic ammonia
  - Stimulates movement . . .
  - Increases return of blood to heart - IF supine
Presyncope Management

Dental treatment may continue . . .

*IF* both the doctor and patient are comfortable.

Determine reason for episode and manage

---

Healthy young children

*DO NOT* faint

---

In the pediatric dental environment

*it is the parent* (usually the father)

*who is most likely to faint*
Syncope

Vasodepressor syncope, Vasovagal syncope, Common faint

- In the absence of treatment
- Decompensation [fatigue] occurs:
  - Severe bradycardia develops
    - HR between 0 and 20 (Periods of asystole)
  - Blood pressure & cerebral blood flow diminish
  - Consciousness is lost

In the presence of continued cerebral hypoxia . . . anoxia
- Muscle twitching to GTCS may develop

Prevented or terminated by:
- Positioning
- Airway maintenance

Syncope management

P . . . Position
- Supine with feet elevated 10-15 degrees
A . . . Assess, compress chest . . . not necessary
B . . . Assess, maintain usually necessary
- Oxygen, prn
C . . . Assess, ventilate . . . usually not necessary
Syncope management

Following the return of consciousness

Manage symptomatically:
- Oxygen
- Cool compress

Permit recovery

Determine cause of episode
- Consider future Tx modifications

Discharge in custody of responsible adult

Respiratory Distress

EMERGENCY MEDICINE

Hyperventilation

An anxiety-induced situation in which the victim loses control over their breathing.
Hyperventilation

The hyperventilating person is breathing:
(1) extremely rapidly [tachypnea]
(2) either shallow or deep

In the pediatric dental environment, hyperventilation will almost always be a manifestation of ACUTE ANXIETY.

S&S of hyperventilation are produced by the LOSS of CO₂ from the blood leading to HYPOCAPNEA.

HYPERVENTILATION
Clinical manifestations
Goals of treatment of hyperventilation:

(1) Calm patient
(2) Decrease respiratory rate
(3) Elevate CO₂ level

Victim cups their hands over their mouth & nose, rebreathing exhaled air, which contains high levels of CO₂

In the absence of adequate treatment, carpopedal tetany may develop
Hyperventilation

P . . .
C . . .
A . . .
B . . .
D . . .

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Bronchospasm

Asthma
Hyperactive Airway Disease

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Damaged cells

When cells are damaged, hypoxic or anoxic, they become hyperexcitable

Bronchi = BRONCHOSPASM

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Asthmatic Triggers

Box 13-1 Causative factors for acute asthma

- Allergy (antigen-antibody reaction)
- Respiratory infection
- Physical exertion
- Environmental and air pollution
- Occupational stimuli
- Pharmacologic stimuli
- Psychological factors

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What kind of asthma do you have?
- Allergic . . . non-allergic

Allergic: What precipitates an acute episode?
- Aspirin
- NSAID's
- Exercise-induced asthma
- (bi)Sulfites
- Vasopressor-containing local anesthetics

In the pediatric dental environment, bronchospasm will almost always be a manifestation of ACUTE ANXIETY.

What drug[s] do you use for an acute episode?
- Your ‘Rescue Drug’

- Beta agonists, such as:
  - Albuterol [Pro-Air, Proventil, Ventolin]
  - Metaproterenol [Alupent]

What drug[s] do you use to minimize/prevent acute episodes?
- Inhaled steroids (triamcinolone - Azmacort)
- Long-acting beta agonist (salmeterol - Serevent)
Asthma

Have you ever been hospitalized for your asthma?

Status asthmaticus
- Bronchospasm that is refractory (resistant) to 2 doses of the ‘rescue drug’ (bronchodilator)

Remind patient to bring their "rescue drug" with them to dental office

Treatment of asthma:
- Inhaled steroids . . . to prevent acute episodes
- Bronchodilator . . . to treat acute episodes

Signs & symptoms of acute bronchospasm

Feeling of chest congestion
Cough: c/s sputum production
- Wheezing
- Dyspnea
- Patient sits up
- Use of accessory muscles of respiration
- Increased anxiety
- Tachypnea

Bronchospasm

P . . .
C . . .
A . . .
B . . .
D . . .
Bronchospasm management

Administer bronchodilator . . .
   episode terminates

Subsequent dental care

Discharge of patient

Bronchospasm Management

Summon EMS . . . if
   patient requests
   or
   episode is refractory to
   2 doses of bronchodilator

Status Asthmaticus

*Status asthmaticus* is an acute exacerbation of asthma that remains unresponsive to initial treatment with bronchodilators.

Status Asthmaticus

- If bronchospasm is not relieved, or
- If doctor is uncomfortable, or
- If parent or child wishes, or
  *ACTIVATE EMS STAT*
**Box 13-4 Clinical signs and symptoms of hypoxia and hypercarbia**

**Hypoxia**
- Restlessness, confusion, anxiety
- Cyanosis
- Diaphoresis (profuse sweating)
- Tachycardia, cardiac dysrhythmias
- Coma
- Cardiac and/or renal failure

**Hypercarbia**
- Diaphoresis
- Hypertension (converting to hypotension, if progressive)
- Hyperventilation
- Headache
- Confusion, somnolence
- Cardiac failure

---

**Status Asthmaticus**
- If EMS delayed, or
- If situation deteriorates . . .
- IM epinephrine q5m
- Vastus lateralis
- 0.3 mg or 0.15 mg of 1:1000

15 - 30 kg = 0.15 mg
>30 kg = 0.3 mg

---

**Vastus Lateralis**

Epinephrine 1:1,000

Vastus lateralis

---

**Drug-Related Emergencies**

**EMERGENCY MEDICINE**
Systemic adverse drug reactions

- The **TWO** systemic adverse reactions that **ALL** drugs can produce are:
  - **ALLERGY**
  - **OVERDOSE** (toxic reaction)

Overdose v. Allergy

**Dosage**

- Drug **OVERDOSE** *IS* dose-related:
  - You have to give enough to produce a high blood level
- **ALLERGY** *IS NOT* dose-related:
  - Allergy is an over-reaction to a foreign substance (allergen) by the immune system

Overdose v. Allergy

**Signs & Symptoms**

- **OVERDOSE:**
  - *S&S* are related to **NORMAL** pharmacology of drug
  - *S&S* will **VARY** depending upon drug producing OD
    - ETOH . . . CNS depression (excessive depression)
    - Cocaine . . . CNS, CVS stimulation (excessive stimulation)

- **ALLERGY:**
  - *S&S* are **ALWAYS** the same regardless of etiology.
  - Itching, hives, rash, bronchospasm, vasodilation

Drug Related Emergencies

**Allergy**
Allergy

Allergy represents an OVERREACTION by the body's immune system to a foreign substance (allergen).

Allergic Reactions

Diagnosis & Management

Histamine

The Primary Mediator of the Allergic Reaction

DISTRIBUTION:

- Everywhere, but higher amounts in lungs, skin and GI
- Rapidly stored in mast cells and basophils

Allergen

Mast cells & Basophils

Histamine
Leukotrienes
ECF – Anaphylaxis
Kallikreins
Prostaglandins

S&S of allergy
**Histamine**

The Primary Mediator of the Allergic Reaction

**RELEASE CONDITIONS:**

- Type 1 hypersensitivity (allergy)
- Tissue injury
- Drugs & other foreign compounds, e.g. meperidine (Demerol)

**Histamine**

The Primary Mediator of the Allergic Reaction

- Heart rate = increases
- Blood pressure = decreases
- Small blood vessels = dilate
- Flushing
- Increased capillary permeability

**Histamine**

Pharmacology - Summary

- Itching . . . Pruritis
- Hives . . . Urticaria
- Rash . . . Erythema
- Bronchospasm
- Vasodilation

**Allergic Reactions**

Possible predictors of severity of the reaction

- Rapidity of ONSET of signs and symptoms
- PROGRESSION of signs and symptoms
Onset of S&S

Delayed:
- S & S develop slowly [>60 min]
- Reaction involves skin

Immediate:
- S & S develop within minutes of exposure
- Reaction involves respiratory a/o cardiovascular systems

Progression of S&S

Usual: Starts as SKIN - does not progress
- Stimulation of EXOCRINE GLANDS e.g. tearing, nasal discharge (runny nose)
- Spasm of intestinal smooth muscle (e.g. cramping)
- Bronchospasm
- Vasodilation of blood vessels

Delayed onset skin reaction

P . . .
C . . .
A . . .
B . . .
D . . .

> 1 hour after antigenic exposure

Allergic Skin Reaction
Delayed Onset Skin Reaction

Management:
D . . .
Parenteral histamine blockers:
- Diphenhydramine . . . IM (vastus lateralis)
  - 50 mg adults
  - 25 mg (< 30 kg)

Delayed Onset Skin Reaction

Management:
D . . .
Oral histamine blockers:
- Diphenhydramine
  - 50 mg qid adults
  - 25 mg qid < 30 kg
  - For 3 days

ANAPHYLAXIS

Common etiologies
- Stinging insects
- Penicillin
- Latex
- Peanuts
- Aspirin, NSAIDs
- Shellfish
Anaphylaxis

Definition: An acute and potentially life-threatening multi-system allergic reaction

- Respiratory compromise and cardiovascular collapse cause most deaths
- Time to CV collapse: Food (25-35 min); Insect sting (10-15 min)

Anaphylaxis . . . Management

P . . . Based upon primary complaint:
  - “Can’t breathe” . . . upright
  - “Feel faint” . . . supine, feet elevated

C . . . prn
A . . . prn
B . . . prn

The diagnosis and management of anaphylaxis practice parameter: 2010 Update

Lieberman P, Nicklas RA, Oppenheimer J, et al
Allerg Clin Immunol 126:477-480, 2010
The more rapidly anaphylaxis develops, the more likely the reaction is to be severe and potentially life-threatening.

Prompt recognition of signs and symptoms of anaphylaxis is crucial. If there is any doubt, it is generally better to administer epinephrine.

Epinephrine and oxygen are the most important therapeutic agents administered in anaphylaxis. Epinephrine is the drug of choice, and the appropriate dose should be administered promptly at the onset of apparent anaphylaxis.

There is no absolute contraindication to epinephrine administration in anaphylaxis.
Anaphylaxis . . . Management

D . . . Definitive care

- Epinephrine
  - As soon as possible
  - Every 5 minutes until
  - Victim recovers
  - Help (9.1.1) arrives

Anaphylaxis . . . Management

D . . . Definitive care

- Epinephrine
- Basic life support, as needed
- Oxygen
- EMS (9.1.1)

Anaphylaxis . . . Management

- 0.3 mg/dose = adult
- 0.15 mg/dose = child (15 - 30 kg)

OXYGEN

- “E” cylinder
- Portable delivery system
Anaphylaxis: How do patients die?

Vasodilation
- Increased vascular permeability may shift 35% - 50% of intravascular volume to the extravascular space within 10 minutes

Anaphylaxis . . . Management (1)
- Assess C, A, B’s
- Epinephrine 0.3 - 0.5 mg of 1:1,000 IM thigh (adult); 0.15 mg of 1:1,000 IM thigh (child). Give quickly and repeat every 5 - 15 minutes as needed
- Classically, adult dose is given to children >30 kg, but may also give to 25 kg
- Give as soon as possible

Anaphylaxis . . . Management (2)
- Position supine, feet elevated. This position is equivalent to infusion 1 - 2 liters in the central vascular compartment

Anaphylaxis . . . Management (3)
- Diphenhydramine: 25-50 mg IV (adults); 1 mg/kg children (up to 50 mg)
- Prednisone 0.5 mg/kg/day orally - will have NO ACUTE EFFECT
**Anaphylaxis . . . Management**

- Oxygen - for patients with prolonged reactions, are short of breath, experiencing chest pain
- Call 9.1.1. prn

---

**Epinephrine in Anaphylaxis**

- There are NO absolute contraindications to using epinephrine in anaphylaxis
- Up to 23% of patients with anaphylaxis who receive epinephrine are reported to receive a 2nd dose because of ongoing S&S or a biphasic reaction

---

**Epinephrine - Thigh or Deltoid**

- IM injection in the thigh has been shown to provide more rapid absorption and higher plasma levels in asymptomatic patients.
- Not studied in patients with active anaphylaxis
- Obese patients - IM injection in thigh may be unrealistic. NO data that SC or IM dose in the deltoid fails in anaphylaxis
**Epinephrine - Alternative routes**

- Alternative routes for epinephrine injection such as SC, sublingual or inhalation are NOT recommended because they do not achieve the necessary high, rapid plasma concentrations.

---

**Why epinephrine?**

Reverses 2 components of anaphylaxis which lead to death:
- Bronchospasm . . . Epi is bronchodilator
- Hypotension . . . Epi is vasopressor
- Epi, through its vasoconstrictive actions can reverse edema, but only if administered PROMPTLY

Works fast
- IM vastus lateralis w/l ± 2 minutes

---

**Anaphylaxis . . . Management**

**Goal: short-term survival**

- Keep the victim alive until
- They recover
- Help arrives on scene
Anaphylaxis . . . Management

Goal: short-term survival

- Epi . . . Epi . . . Epi
- BLS, prn
- Oxygen
- EMS

Recovery:

- Relief of bronchospasm
- Elevation of blood pressure

Recovery:

Epinephrine:

- Rapid onset - GOOD
- Short duration - BAD

Histamine blocker IM (1 mL)

- Diphenhydramine HCl 50 mg
  - 25 mg - up to 30 kg

Once life is out of danger . . .
Anaphylaxis . . . Management

Histamine blockers IV

Corticosteroids IV
- Decadron, Solu-Cortef, Solu-Medrol
- Slow onset, long duration
- Stabilize cell membranes
- Prevent edema, vasodilation

Hospitalization
- ED . . . several hours - observation
- Hospitalized . . . overnight - observation
- Hospitalized . . . several days

Anaphylaxis
- Represents the only emergency situation which requires the immediate administration of a drug, epinephrine, in order for the victim to have a chance of survival.
- The more rapidly epinephrine is administered at onset of anaphylaxis the greater the chance of survival
- Absent epinephrine, survival from anaphylaxis is less likely

Since allergy has the potential to be life-threatening . . . How can a doctor prevent an allergic reaction?
When confronted with ‘alleged’ allergy:

**ALWAYS BELIEVE THE PATIENT!**

Do **NOT** administer or prescribe the drug in question until all doubt has been erased from the mind of both the doctor and the patient.

---

(1) Describe your ‘allergic’ reaction:

- **TRUE** allergy: ‘Itching, hives & a rash’, bronchospasm (wheezing), Drop in BP (hypotension)
- **NOT** allergy: dizzy, lightheaded, faint, shaking, palpitations

---

(2) How was your ‘allergic’ reaction managed:

- **TRUE** allergy: Epinephrine, Histamine-blocker (diphenhydramine [Benadryl]), Corticosteroid
- **NOT** allergy: Nothing (it got better), Oxygen, “Smelling salts” (aromatic ammonia vaporole)

---

. . . Cannot always be prevented.

. . . May occur even with prior history of no adverse response to a drug.

. . . Must always be prepared for.
Heart muscle - MYOCARDIUM contracts, squeezing blood out of the heart into the pulmonary artery (right side of heart) or aorta (left side of heart).

To continue to function the myocardium requires its own blood supply.

Myocardial blood supply is from CORONARY ARTERIES.
Coronary Artery Disease

The deposition, over time, of a lipid-rich plaque (LDL) within the walls of coronary arteries

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Coronary Artery Disease

When the workload of the heart increases (e.g. stress = pain, fear), myocardium needs an increased blood flow which cannot be met by narrowed coronary artery

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Transient Myocardial Ischemia = Angina Pectoris

Myocardium not receiving an adequate blood supply becomes ischemic, leading to the onset of anginal ‘pain’

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Angina Pectoris

With rest or administration of nitroglycerin the myocardial workload decreases and the chest ‘pain’ dissipates

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Angina pectoris and dentistry

The only time ANGINA should be considered as a diagnosis in acute chest pain is where the patient (victim) has a PREEXISTING HISTORY of ANGINA.

Consider myocardial infarction when:

In anginal patient when:
- 'Pain' worse than usual
- 3 doses of nitroglycerin fail to relieve discomfort
- doses every 5 minutes
- Nitroglycerin relieves ‘pain’, but ‘pain’ returns.

Consider myocardial infarction:

ALWAYS when there is no prior history of cardiovascular disease.

Prolonged Myocardial Ischemia

RUPTURE of the PLAQUE into the lumen of the coronary artery terminates blood flow to an area of myocardium.
Prolonged myocardial ischemia leads to damage and then death (infarction) of myocardium.

**Acute Coronary Syndrome**

- **Angina Pectoris**
- **Acute Myocardial Infarction**

**First Time Chest ‘Pain’**

- **P**...  
- **C**...  
- **A**...  
- **B**...  
- **D**...

**Consider Myocardial Infarction:**

ALWAYS when there is no prior history of cardiovascular disease.
Acute myocardial infarction

P . . . Position
C . . . Circulation
A . . . Airway
B . . . Breathing
D . . . Definitive care
MONA

MONA

Acronym for the PRE-HOSPITAL MANAGEMENT OF A SUSPECTED MYOCARDIAL INFARCTION

MONA

D . . . Definitive care

“Greet the ambulance at the door to the emergency department with MONA”
MONA

Morphine
Oxygen
Nitroglycerin
Aspirin

Prehospital management of suspected MI

Acute Myocardial Infarction

P . . . Position
C . . . Circulation
A . . . Airway
B . . . Breathing
D . . . Definitive care
MONA = NONA

MONA = NONA

Morphine = N₂O - O₂
Oxygen
Nitroglycerin
Aspirin

Prehospital management of suspected MI

Nitrous Oxide - Oxygen

50% - 50%

As analgesic as IV morphine
- Separates pain from suffering
- Sedative
- Relaxes scared patient
50% O₂
- 2.5 times ambient air

Prehospital management of suspected MI
Aspirin in Myocardial Infarction

- 325 mg. chewed, swallowed - POWDERED, if available
- 20 minute onset
- Prevents blood clot (thrombosis) from increasing in size
- Increases chances of primary balloon angioplasty being successful

Prehospital management of suspected MI

Acute Myocardial Infarction

- Classic Heart Attack Symptoms
- Nausea, or vomiting
- Sweating
- Pallor (pale skin)
- "Crushing" chest pain
- Anxiety
- Difficulty breathing
Acute Myocardial Infarction

SILENT MI

- Women (up to 50%)
- Elderly
- Diabetics
- Do not present with classic signs & symptoms

Acute Myocardial Infarction

When cells are damaged, hypoxic or anoxic, they become hyperexcitable

Myocardium = DYSRHYTHMIAS

Arrhythmia or Dysrhythmia

- Arrhythmia: A = ‘not’ or “without”
  Therefore, an arrhythmia implies NO beat or a ‘flat line’.
- The only true arrhythmia is asystole (no contraction)
- Dysrhythmia: Dys = abnormal
  ‘An abnormal cardiac rhythm’
Premature Ventricular Complexes
Monomorphic (Unifocal)

ALL PVC’s look alike

Area of ischemic myocardium

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Premature Ventricular Complexes
Polymorphic (Multifocal)

PVC’s vary in size & shape

MORE CLINICALLY SIGNIFICANT!

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Patient is CONSCIOUS
8 of 11 contractions (systoles) are normal, ejecting blood into the systemic circulation.

Output of blood is 73% of normal

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Premature Ventricular Contractions
PVC’s

Patient is CONSCIOUS yet demonstrating S&S of decreased blood flow to periphery:
- Cyanotic mucous membranes
- Ashen gray skin color
- Diaphoresis
- Generalized feeling of fatigue

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Premature Ventricular Contractions
Bigeminy

Cardiac output = 50%

The dentist’s objective in a medical emergency situation
Keep the victim alive until:
(1) Recovery occurs or
(2) Help arrives to take over management

So, what exactly has been done prior to EMS arrival to PREVENT the occurrence of cardiac arrest?

Morphine (N\textsubscript{2}O-O\textsubscript{2})
Oxygen
Nitroglycerin
Aspirin

NOTHING
Ischemic myocardium still exists;
Dysrhythmias still occurring;
But the pump - though damaged - is still pumping

We have been LUCKY
Most OOH-SCA are related to acute dysrhythmias (VF/pulseless VT).

Most occur during the 1st hour after symptom onset.

52% of MI mortality within 1st hour post-symptom onset.

Deaths from MI

Getting into the ‘system’ (9.1.1) is THE most important thing that can be done for the victim of a ‘suspected heart attack’ (AMI).
CARDIAC ARREST occurs when the heart ceases to PUMP BLOOD

There are four rhythms that constitute cardiac arrest:

1. (pulseless) Ventricular Tachycardia
2. Ventricular Fibrillation (coarse & fine)
3. Asystole
4. Pulseless Electrical Activity (PEA)

VT with a pulse or pulseless VT

The ischemic area of myocardium has taken control. ALL beats are PVCs

Cardiac Arrest

- Pulseless Ventricular Tachycardia
- Ventricular Fibrillation
- Asystole
- Pulseless Electrical Activity

VT is an organized rhythm (all beats similar)
Extremely rapid ventricular rate (~180 bpm)
VT degenerates into a CHAOTIC, unorganized quivering of the myocardium - VENTRICULAR FIBRILLATION.

Common clinical findings:
- Disappearance of pulse with VF
- Collapse, unconsciousness
- Agonal breaths → apnea in < 5 minutes
- Onset of reversible death
What happens when the heart stops **pumping** blood?

Blood pressure falls to zero, Pulse isn't palpable, Consciousness is lost, and Respirations cease. And the victim is . . .
What is the difference between 'Heart Attack' and Sudden Cardiac Arrest?

- 'Dead'
- Alive

Clinical Death

The victim 'looks' dead
At the moment of clinical death, the heart stops pumping, circulation of blood ceases:

- 65% of blood is in the venous circulation
- 5% of blood is in capillaries
- 30% of blood is arterial

Our goal in resuscitation is to prevent the PERMANENT death of the victim:

- Cells in the victim's body will die when they use up all of the O₂ available to them
- CELLULAR or BIOLOGICAL death occurs
- Biological death is irreversible

The time between the occurrence of CLINICAL and BIOLOGICAL DEATH represents the period in which RESUSCITATION may be successful.

Surviving Sudden Cardiac Arrest

Brain cells (neurons) have a high metabolic rate.

A degree of permanent neurologic deficit can be expected when neurons are deprived of O₂ for 3 or more minutes.
A very important fact about CPR (Basic Life Support):

- Basic life support . . .
  Circulates oxygenated blood . . .
  Does NOT convert cardiac arrest into a functional rhythm (e.g. NSR)

- BLS simply increases the time during which the myocardium is still alive

Early BLS ↑ duration of VF (fine VF) + delayed defibrillation

Global Neurological Damage

Begin brain damage

Death . . . or . . .

Severe brain damage
Early BLS + very early defibrillation (coarse VF)

- Up to 74% in some situations
- Neurological deficit unlikely

EMS arrival
Survival Rates

No CPR
- Defibrillation
- 0 - 2% survive

Early CPR
- Delayed Defibrillation
- Early ALS
- 2 - 8% survive

Early CPR
- Very early defibrillation
- Early ACLS
- 20% survive

Early CPR
- Defibrillation
- ACLS
- Up to 74% survive
How critical is response time to survival?

For every minute a victim is in cardiac arrest, the chance of survival decreases by between 7% and 10%.

This assumes that BLS is being administered.

Survival to hospital discharge

LV casino . . . 74%
Airports . . . 60%
Seattle WA . . . 46%
Boston MA . . . 40%
San Francisco . . . 9%
USA average . . . 7.4%
New York City . . . 2%
Los Angeles CA . . . 1.4%
Chicago IL . . . 1%
Simplistically, an AED is a battery operated computer which is capable of determining whether or not VF/VT is present.

- **VF/VT present:**
  - ‘SHOCK ADVISED’

Any rhythm other than VF/VT
- PEA, asystole, NSR
  - ‘NO SHOCK ADVISED’
  - ‘Check airway’
  - ‘Check breathing’
  - ‘Check pulse’
  - ‘If no pulse, continue CPR’

How an AED works

- **VF** . . . chaotic, uncoordinated ‘quivering’ of myocardium

AED delivers a biphasic (2 shocks) shock across the chest - through the myocardium - depolarizing all myocardial cells at the same time.
AED delivers a biphasic (2 shocks) shock across the chest - through the myocardium - depolarizing all myocardial cells at the same time, producing . . .

ASYSTOLE

The more ‘alive’ the myocardium when depolarized the more likely it is that the SA node will spontaneously depolarize inducing a normal sinus rhythm.

The more ‘alive’ the myocardium when depolarized the more likely it is that the SA node will spontaneously depolarize inducing a normal sinus rhythm.

REBOOT the HEART

How an AED works

Can the chest be compressed adequately with the victim in the dental chair?

YES

Lepere AJ, Finn J, Jacobs I
Efficacy of cardiopulmonary resuscitation performed in a dental chair
J Australian Dental Association 48(4) 244-247, 2003 (December)
Rules to Remember

The very first step in management of all medical emergencies is **BASIC LIFE SUPPORT**, as needed

And remember . . . “Stuff Happens”

<table>
<thead>
<tr>
<th>Condition</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope</td>
<td>15,407</td>
<td>50.3%</td>
</tr>
<tr>
<td>Mild allergy</td>
<td>2,583</td>
<td>8.4%</td>
</tr>
<tr>
<td>Angina Pectoris</td>
<td>2,552</td>
<td>8.3%</td>
</tr>
<tr>
<td>Postural hypotension</td>
<td>2,475</td>
<td>8.1%</td>
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<tr>
<td>Seizure</td>
<td>1,595</td>
<td>5.2%</td>
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<tr>
<td>Asthmatic attack</td>
<td>1,392</td>
<td>4.5%</td>
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<tr>
<td>Hyperventilation</td>
<td>1,326</td>
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<td>Epinephrine Rxn</td>
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<tr>
<td>Hypoglycemia</td>
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<tr>
<td>Anaphylaxis</td>
<td>304</td>
<td>1.0%</td>
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<tr>
<td>Myocardial Infarction</td>
<td>289</td>
<td>0.9%</td>
</tr>
<tr>
<td>L.A. Overdose</td>
<td>204</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

Emergency Management

- **non-Cardiac arrest**
  - **P** ... position
  - **C** ... circulation
  - **A** ... airway
  - **B** ... breathing
  - **D** ... definitive care

- **Cardiac arrest**
  - **P** ... position
  - **C** ... circulation
  - **A** ... airway
  - **B** ... breathing
  - **D** ... defibrillation

**P - C - A - B**

Keep the victim alive
Thank you . . .

and

BE PREPARED!