Management & Prevention of Medical Emergencies in the Dental Office

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TO GET THE MOST FROM THIS PRESENTATION

- Listen with Intention- It is NO coincidence that you are here
- Be Open to Learning New Information
- Have fun learning!

Objectives

- Identify common medical emergencies encountered in dental practice and the underlying risk factors associated with each.
- Implement preventive strategies through thorough medical history reviews, risk assessments, and patient monitoring protocols.
- Demonstrate appropriate emergency management techniques, including use of emergency drugs, equipment, and Basic Life Support (BLS) skills.
- Develop an office-wide emergency preparedness plan, including staff training, communication protocols, and mock-drill evaluations.

Prevention and Management of Medical Emergencies

- Serious medical emergencies in the dental office are, fortunately, rare HOWEVER..
- Make sure you are calm, and maintain good composure while handling an emergency
- “Medical emergencies can, and do happen in the practice of dentistry”- Malamed

Prevention and Management of Medical Emergencies

- The primary reason for the limited frequency of emergencies is the nature of dental education that prepares us to recognize potential problems ASAP
- However, when some dental procedures are necessary, the increased mental & physiological stress associated with treatment can push patients with systemic issues into an emergency
- Emergencies can occur at any time to any age group, best outcome of patient health depends upon the preparation & teamwork of the entire team

Common Medical Emergencies

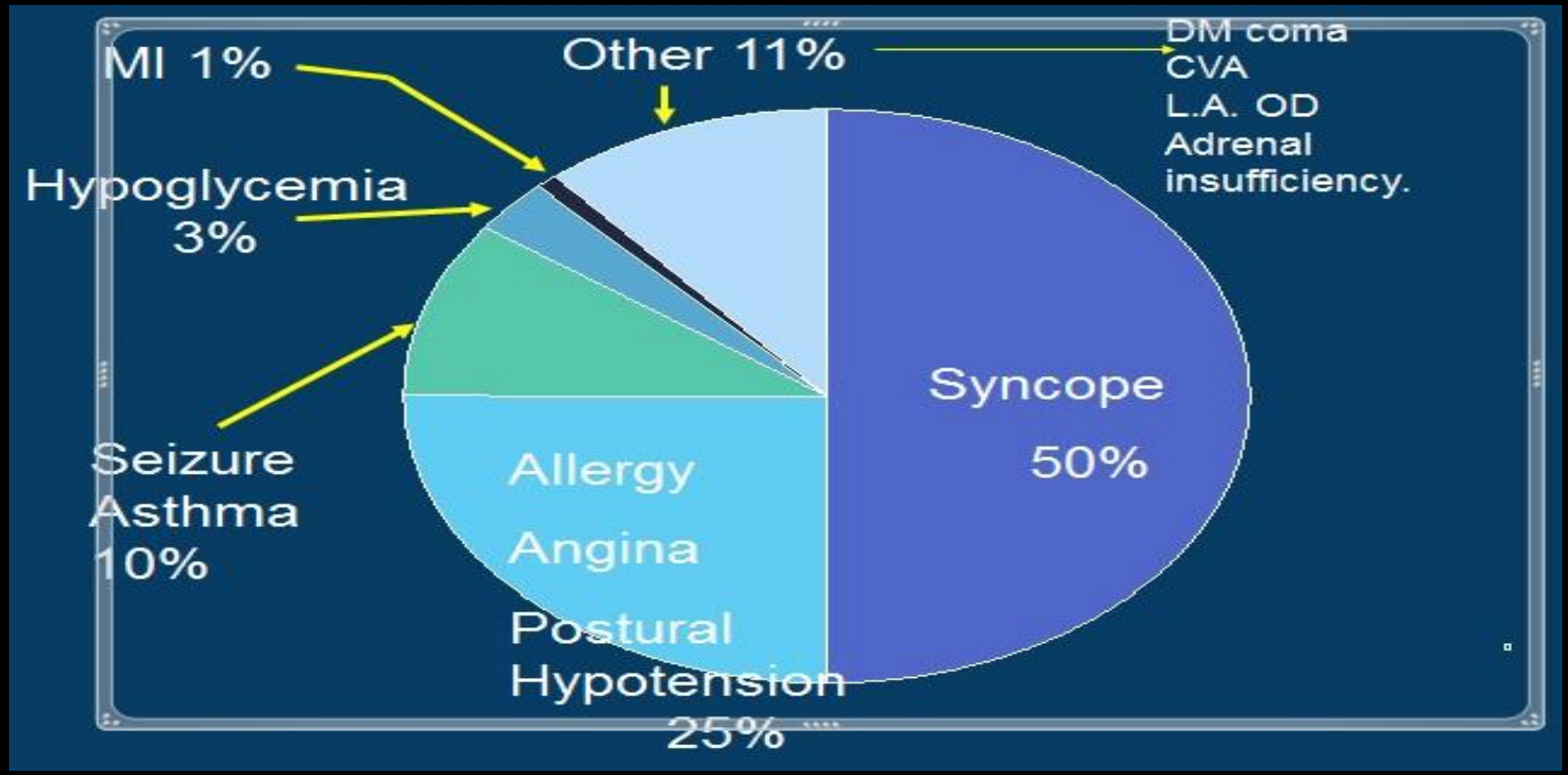
- Syncope (fainting)
- Allergy
- Angina
- Postural (orthostatic) hypotension

TABLE 1. Most Commonly Reported Emergencies Occurring in the Dental Office Among a Survey of 4,307 Dentists[2]

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

Malamed SF. Dimensions of Dental Hygiene. January 2014;12 (1):39-41.

- Most common 4 medical emergencies in a general dental practice setting that occur ~ 75% of all emergencies
- Multiple studies show syncope to be the emergency encountered primarily



- Syncope is the one emergency, after syncope, seizures & asthma together make up 10%
- Allergy/angina/postural hypotension make up 8% each, or ~ 25% of all emergencies
- Hyperventilation, although not quantified in the chart, also occurs frequently

Why Is Syncope Common?

- Possible stress reaction such as delivering local anesthetic leading to blood pooling in the blood vessels within the lower extremities
- Less blood flow returns to the heart resulting in decreased reduction in blood flow to the brain
- Patients will start to sweat become dizzy leading to loss of consciousness & possible seizure type activity due to loss of brain O_2

Most Common Emergencies I Have Encountered

- Hypoglycemia

- Syncope

- Anxiety related issues

- Seizure

With all emergencies, the key is to remain calm and poised

Prevention

Factors that increase the potential for emergencies are:

- Age of the patient (very young & old patients @ higher risk)
- Ability of the medical profession to keep relatively sick pts ambulatory & able to seek dental care. However, these pts could be at risk if seen at a regular dental office
- The increasing variety of drugs dentists administer in their offices

Is Surgery the Culprit?

The incidence of medical emergencies is higher in patients receiving surgical procedures vs. nonsurgical care because:

- Surgery is more often stress provoking
- A greater number of medications are typically administered to perioperative patients
- Often longer appointments are necessary when performing surgery

Risk Assessment

The first step in prevention is risk assessment:

- Who are you dealing with? Medically compromised or anxious pts etc.
- Taking a medical history, including a review of systems guided by pertinent positive responses in the pt's hx
- Patients can be poor historians in terms of their health, make sure they can answer relevant medical hx

Risk Assessment

- Identify all medications (OTC & prescription) taken or supposed to be taken by the patient
- Review the medical hx & discuss all the relevant issues w/the patient
- Examine all recent lab tests or images that the pt. may bring
- Examine the pt. for any disease signs & symptoms
- Obtain a medical consult as needed, if pt. has systemic issues that you need more information, or a poorly controlled or undiagnosed problem being reported per the patient

Risk Assessment

- Always make sure you know your patient, "selective memory"
- Good rapport leads to open communication & less confusion

ASA Classification

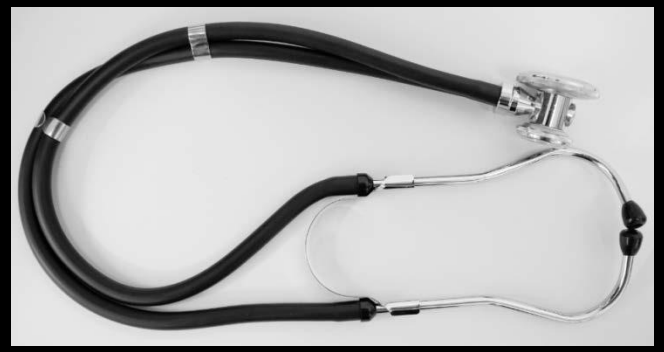
American Society of Anesthesiology (ASA) RISK Classification → General Anesthesia

ASA PS Classification	Definition	Example
ASA I	A normal **healthy** patient	Healthy, non-smoker, no or minimal alcohol use
ASA II	A patient with **MILD** systemic disease	Mild disease without significant functional limitations. Current smoker, social alcohol drinker, pregnancy, obesity (BMI <40), well-controlled DM/HTN, mild lung disease
ASA III	A patient with **SEVERE** systemic disease	Significant functional limitations; One or more moderate to severe diseases. Poorly-controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, history (>3 months) of MI, CVA, TIA, or CAD/stents.
ASA IV	A patient with **SEVERE** systemic disease that is a **CONSTANT THREAT to LIFE**	Recent (<3 months) MI, CVA, TIA or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, shock, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis
ASA V	A moribund patient who is **not expected to survive without the operation**	Symptomatic congenital cardiac abnormality, congestive heart failure, acute hypoxic-ischemic encephalopathy, shock, sepsis, disseminated intravascular coagulation, automatic implantable cardioverter-defibrillator, ventilator dependence, endocrinopathy, severe trauma, severe respiratory distress, advanced oncologic state.
ASA VI	Declared **brain-dead** patient whose organs are being removed for donor purposes	

Vitals and Physical Exam

- Vital signs should be recorded & a clinical exam should be performed
- Any patient can have a medical emergency at any time; however certain medical conditions predispose patients to medical emergencies in the dental office
- These conditions are more likely to turn into an emergency when the patient is physiologically or emotionally stressed

Predisposing Medical Conditions



- Identify & record vital signs and identify ranges that necessitate medical referral, emergency referral, or re-evaluation

- Study report that electronic devices are accurate to within 3% of a manual bp cuff (Burket et al.)

American Heart Association

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)	and/or	DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

- **Systolic blood pressure** (the first number) – indicates how much pressure your blood is exerting against your artery walls when the heart beats.
- **Diastolic blood pressure** (the second number) – indicates how much pressure your blood is exerting against your artery walls while the heart is resting between beats.

Anxiety

Most common conditions affected/precipitated by anxiety are:

- Angina pectoris
- Thyroid storm (untreated hypo/hyperthyroidism)
- Myocardial infarction
- Insulin shock
- Asthmatic bronchospasm
- Hyperventilation
- Adrenal insufficiency
- Epilepsy
- Severe hypertension

Identifying Dental Anxiety Patients

- Poor body language
- Report traumatic dental experiences repeatedly
- Start to become fearful and cry
- Sweaty, possible panic attacks
- Requests sedation from personal experiences *

Pain Control to Alleviate Anxiety

- Obtain good local anesthesia and post-op pain control

- Consider implementing **Nitrous Oxide** or other sedation options into tx plan for anxious, asthmatics, mild cerebral palsy, strong gag reflex patients

Plan Modification

- Once patients who are likely to have medical emergencies are recognized, practitioners can prevent most problems by modifying their treatment
- Clinicians must be prepared to postpone dental treatment based on vital signs or based on certain findings in the medical history, even if a patient argues or insists that they are fine
- Recommend med consult if pt bp is high on 3 readings, take a average
- Prevention is the cornerstone in the management of ALL medical emergencies!

Referral/Consultation with Physician

- A competent clinician must have the ability to recognize medical conditions requiring referral to (or at least a conversation with) a medical professional *prior* to commencing treatment

- Examples include- Recent surgeries/hospitalizations, hx of stoke/heart attack, cardiac conditions (angina, HTN), stability of diabetes, renal failure, asthma, allergic/drug reactions, etc.

- a consult form. If
- ”
- ow??? INR, Bleeding

Medical Consultation Request

To: _____

_____

_____

_____

Please Return To the Above Address

Re: _____ **DOB:** _____

Our patient has presented with the following medical problem(s): _____

_____

_____

The following treatment is scheduled in our dental office: This is the part that we do not describe in detail and just write dental services being rendered, e.g., PLAVIX

_____

_____

Signature _____ **Date:** _____

PHYSICIAN'S RESPONSE

Please consider the patient's current cardiovascular condition and the history and status of infectious diseases. Since dental treatment is known to cause bacteremias, pre-medication may be necessary. Ordinarily, local anesthesia is obtained with 2% Lidocaine, 1:100,000 Epinephrine.

1. ☐ PROCEED with dental treatment without special precautions.
   ☐ PROCEED with the following recommendations and/or precautions:

   ☐ Prophylactic use of antibiotics Rx: _____

   ☐ Other (Explain) _____

   ☐ DO NOT PROCEED until: (Date & Reason) _____

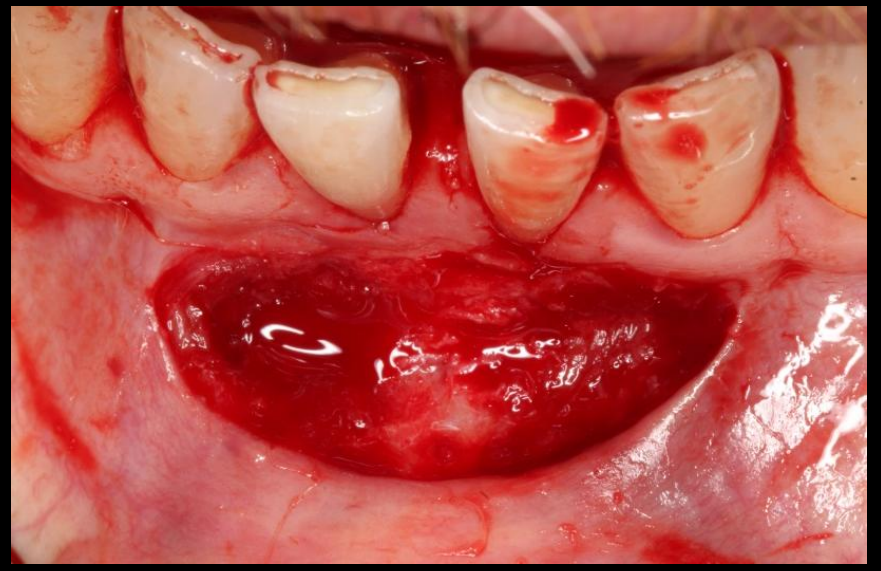
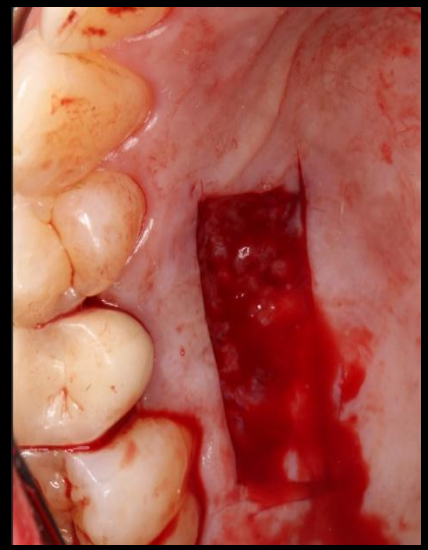
2. Yes☐ No ☐ Patient has infectious disease:
   TB☐ Hepatitis (Acute/Carrier) ☐ AIDS/ARC☐ Other ☐ _____

3. Yes ☐ No ☐ Additional medical information attached.

Physician Signature _____ **Date:** _____

PARENT/GUARDIAN CONSENT

I agree to release _____ medical information to DR. JONATHON LEE and DR. BRIAN LEE

- By ignoring a pts medical history, we increase the chances of having a medical emergency

1 Recognize Symptoms Early

No matter how carefully you manage diabetes with insulin, hypoglycemia (low blood sugar) may still develop very quickly. Symptoms include:

SWEATING

BLURRY VISION

DIZZINESS

ANXIETY

HUNGER

IRRITABILITY

SHAKINESS

FAST HEARTBEAT

HEADACHE

WEAKNESS, FATIGUE

PREPARATION

Questions to ask yourself

- How to prepare for an emergency
- What equipment/drugs that I need
- Scheduling times for certain patients

- Being prepared is the second most important factor after prevention in the management of medical emergencies

- Remember certain emergencies are preventable if we read the room

Appointment Times

- Certain times of the day are more stressful for certain patients
- Per Malamed, apprehensive or medically compromised patients tolerate stress better when rested. Give these pts TLC

- Diabetics should be scheduled in the morning
- Myocardial Infractions/ cardiac pts should be schedule in the early afternoon. Time is important b/c most fatal MI's occur b/w 7-11 AM

Preparedness

Preparation for emergencies includes 4 actions:

- Ensure that your education about emergency management is adequate & up to date (TAKE CE's)
- Have the auxiliary staff trained to assist in medical emergencies
- Establish a system to gain ready access to other health care providers able to assist during emergencies
- Equip the office with equipment & supplies necessary for emergency care

MUST HAVE OXYGEN TANK AT ALL OFFICES

Office Staff Training

- The dentist must ensure that all office personnel are trained to assist in the recognition & management of emergencies
- This should include reinforcement by regular emergency drills in the office & by annual BLS skills renewal
- Office staff should be pre-assigned specific responsibilities in the event of an emergency, so each one knows what is expected

Check List

“Prepare for the worst but hope for the best.”
– Anonymous English Proverb

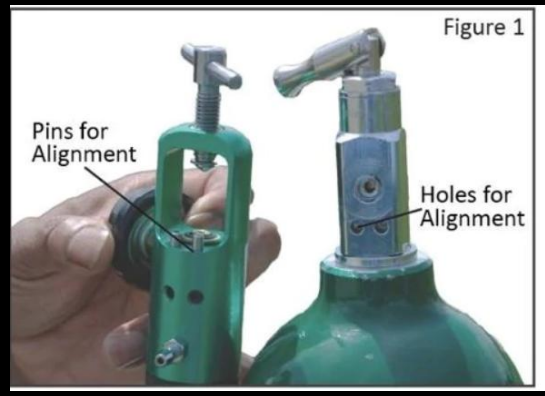
- Temperature (Normal oral temperature is 98.6 °F or 37° C)
- Heart rate (Normal range is 60-100 beats/minute)
- Blood pressure (Normal is ~ < 120/80 mm Hg)
- Respiratory rate (Normal range is 12-18 breaths/minute)

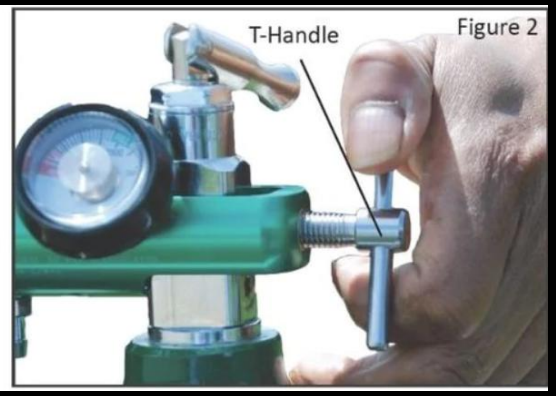
Emergency Drugs for the Dental Office

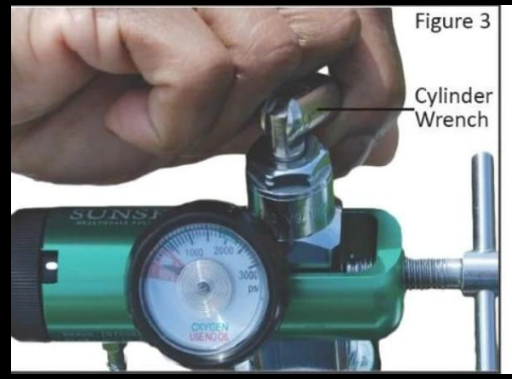
- One emergency item that must be available is **Oxygen**
- Delivering O_2 under positive pressure to the patient is crucial

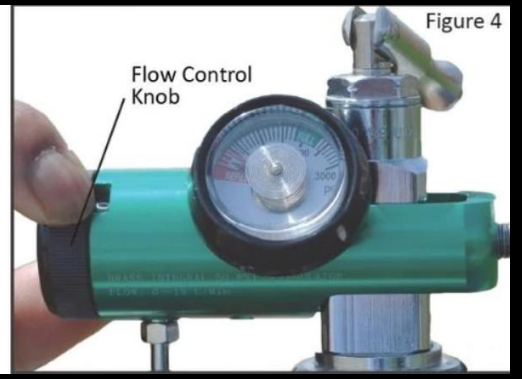
Oxygen Tank and Parts

- An oxygen tank must have a regulator attached to it
- A “key” is needed to open/close an oxygen tank
- Counter-clockwise **opens** the tank; clockwise **closes** the tank









Portable E-cylinder: Pressure

- A full tank reads ~2000 psi
- A half-tank reads ~1000 psi

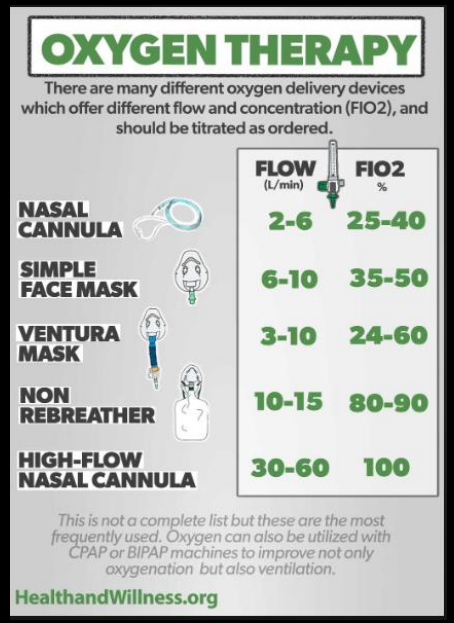
A full tank can deliver:

- ~ 1.9 hours of oxygen @ 6 liters/minute
  ~ 5.7 hours of oxygen @ 2 liters/min
  ~ 30 minutes with oxygen flowing at HIGHEST LEVEL

Oxygen comes in a green tank & Nitrous comes in a blue tank

Emergency Drugs for the Dental Office

- Establishing a system to check periodically that a sufficient supply of oxygen is always available is important



This bag must be attached to deliver 0_2

Positive pressure 0_2 delivery system
- Ambu®bag / 0_2 reservoir
- Child, adult masks
- Can deliver 21% - 100% 0_2

Emergency Supplies & Equipment

- Basic piece of equipment is the dental chair that should be capable of allowing the patient to be placed in a flat position or a head-down or feet-raised position

Emergency Supplies and Equipment

- The final means of preparing for emergencies is by ensuring that appropriate emergency drugs, supplies & equipment are available in the office

Emergency Supplies & Equipment

- Emergency kits containing a variety of drugs are commercially available, dentists may prefer to assemble their own kits

Emergency Supplies & Equipment

- By customizing equipment, dentists can choose only those agents they feel are likely to be most useful during an emergency
- The drugs & all equipment in the kit must be well labeled & checked frequently to ensure that no drugs have passed the expiration date
- Labeling can include not only the drug name but also situations in which the drug is most used

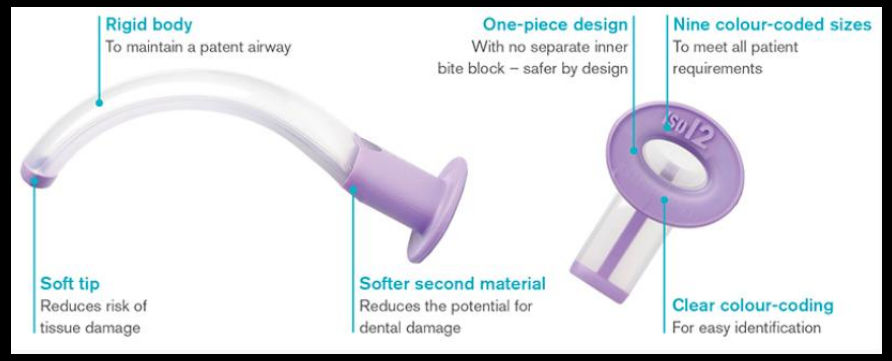
Emergency Drugs for the Dental Office

General Drug Group	Common Examples
PARENTERAL PREPARATIONS	
Analgesic	Morphine sulfate
Anticonvulsant	Diazepam, midazolam
Antihistamine	Diphenhydramine (Benadryl)
Antihypoglycemic	50% dextrose in water, glucagon
Corticosteroid	Methylprednisone (Solu-Medrol), dexamethasone (Decadron), hydrocortisone (Solu-Cortef)
Narcotic antagonist	Naloxone (Narcan)
Sympathomimetic	Epinephrine
Vagolytic	Atropine
ORAL PREPARATIONS	
Antihistamine	Diphenhydramine (Benadryl)
Antihypoglycemic	Candy, fruit juice, sugar
Vasodilator	Nitroglycerine (Nitrostat)
INHALED PREPARATIONS	
Bronchodilator	Metaproterenol (Alupent), epinephrine (Medihaler-Epi)
Oxygen	—
Respiratory stimulant	Aromatic ammonia

Emergency Supplies & Equipment

- Oral, nasal airways, laryngoscopes & endotracheal tubes for trachea intubation may be helpful for dentists trained in their proper use, or for others called into the office to assist during an emergency

- Guedel airways are used to prevent tongue collapsing in the epiglottis & maintaining air way in unconscious patients



Basic Life Support

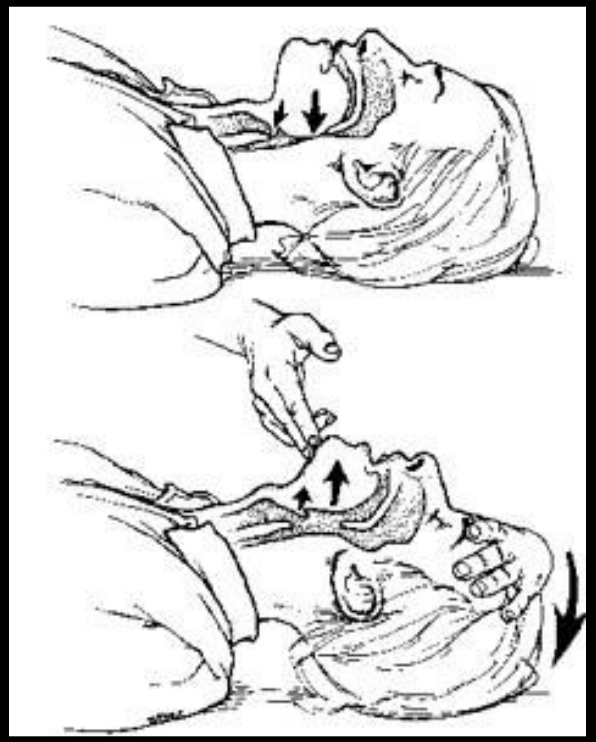
CABs

C - Compressions/Circulation (check pulse)

A - Airway (make sure there is no airway obstruction)

B - Breathing (can patient breath on their own, consider compressions

If all 3 are absent or weak/ thready pulse, consider administering BLS



Airway

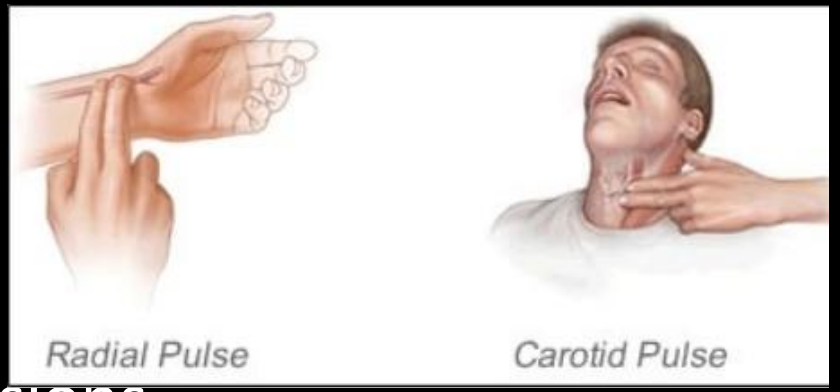
- Remove any foreign objects if possible
- Head tilt/chin lift

Basic Life Support

BREATHING

- Mouth-to-mouth or mouth-to-mask ventilation
- Resuscitation bag ventilation

Basic Life Support (BLS)



- Circulation provided by external cardiac compressions

  1. Check Pulse (10 sec) if there is No pulse start chest compressions (100 per minute)
  2. Heart rate (bradycardia/tachycardia)
  3. Blood Pressure
  4. Cardiac Rhythm

Circulation

Monitors:

- AED
- Blood pressure
- Pulse oximetry
- 3-5 lead EKG

Recognizing: Patient Positioning

Upright / semi-reclined/
(most comfortable)

Supine

Trendelenburg

<u>Recognize which position is indicated</u>:

1. Upright / semi-reclined or most comfortable position
2. Supine
3. Trendelenburg

Upright / Semi-reclined (most comfortable)

<u>Situations/conditions for this position:</u>

Most conscious (awake) patients

Patients experiencing:

Respiratory distress

Asthma

Angina

Acute MI

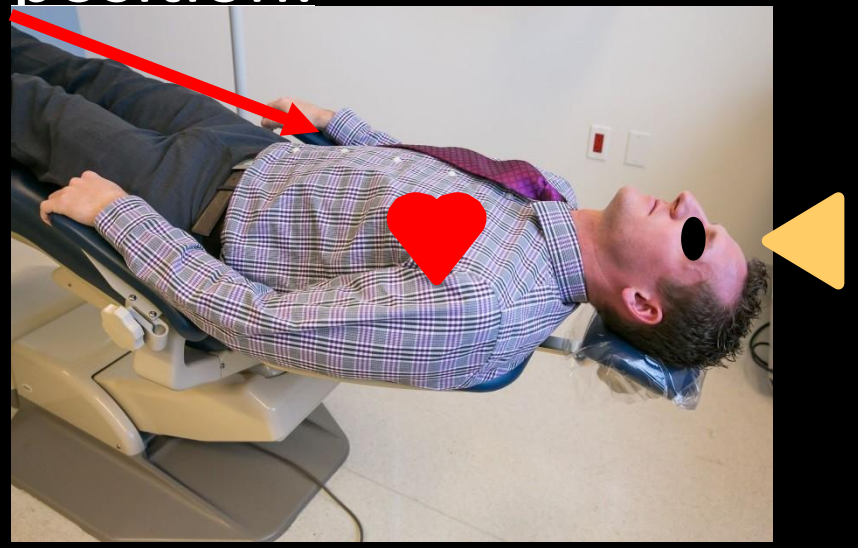
Hyperventilation

Hypoglycemia (awake)

Supine

- Heart and head at the same level, feet elevated

- Situations/conditions for this position:
  - Unconscious patient
  - Syncope
  - Seizure
  - Orthostatic (postural hypotension
  - Severe anaphylaxis



Trendelenburg

- Head below the level of the heart
- Situations/conditions for this position:

  Vomiting patient

  Suspected aspiration or potential for aspiration

  Foreign body obstruction

Recognition- When to call 911

Syncope

- No recovery following syncope after administration of ammonia/oxygen/BLS
- Incomplete recovery after 10 minutes

Epinephrine administered

- Allergy with respiratory involvement
- Laryngeal edema
- Asthma *not* relieved by inhaled bronchodilator

Recognition

- **First time** chest pain or nitroglycerin administration X 3 without relief
- Suspected acute MI
- Atypical seizure /unaccompanied epileptic
- Hypoglycemia with loss of consciousness
- Uncertain severity of emergency
- Incomplete recovery after emergency

RECOGNITION AND STABILIZATION OF MEDICAL EMERGENCIES

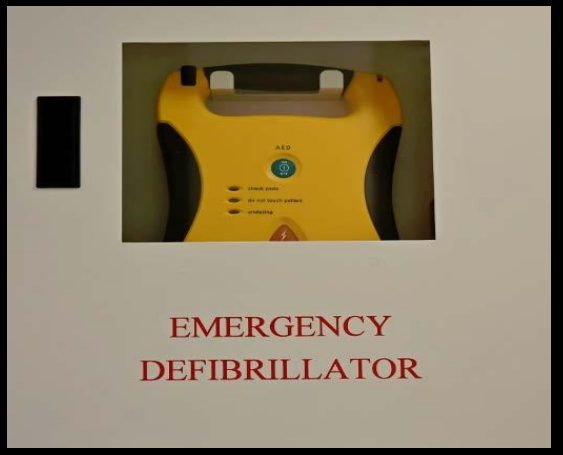
Recognition

- What to do first?
- Patient positioning
- When to call 911

Stabilization

- Specific procedures for each emergency

Continuing Education (CE)



- An important feature of CE's should be to maintain certification in basic life support (BLS), including the use of automated external defibrillator units (AED)

- Every state has legislation regarding the use of AED units in dental offices, currently CA does NOT require the use of AEDs in dental offices

Emergencies

ALLERGY: Delayed

ıtal

ctions

Mild to moderate symptoms:

Swelling of the eyes, face and lips

Runny or congested nose

Raised itchy rash (hives), eczema flare, skin flushing

Itchy mouth

Stomach cramps, nausea, vomiting, diarrhoea

Severe symptoms (anaphylaxis):

Swollen tongue, hoarse voice or cry, difficulty talking

Chest tightness

Breathing difficulties, persistent cough, wheeze

Low blood pressure, feeling faint, collapse

Pale and floppy (babies and small children)

General/Physiology: Delayed Allergy

Delayed – generally occurs *more than 1 hour* after contact/ingestion of offending agent

- Usually localized to skin
- Good prognosis for patient

Signs & Symptoms

- Hives, itching, edema, flushed skin
- Not life-threatening if not progressive

Hypersensitivity Reactions

Skin or mucosal reactions include:

- Localized areas of pruritus
- Erythema
- Urticaria (wheals consisting of slightly elevated areas of epithelial tissue that are erythematous & indurated)
- Angioedema (large areas of swollen tissue generally with little erythema or induration)

Hypersensitivity Reactions

- Although skin and mucosal reactions are not in themselves dangerous, possible first indication of more serious allergic manifestations to follow
- Skin lesions usually take anywhere from minutes to hours to appear
- Skin, Respiratory system, CVS & GI tract can be affected

Manifestations and Management of Hypersensitivity (Allergic) Reactions

Management

- Stop administration of all drugs presently in use
- Administer IV or IM Benadryl 25-50 mg IM
- For mild cases, may consider the oral form (pills or liquid)
- Watch for sedation
- Refer to physician/E.R.
- Prescribe oral antihistamine, such as Benadryl 50 mg q6h

Delayed Allergy: Management

- 50 mg of Benadryl® (or ~25 mg for children) can be administered into the deltoid muscle after drawing the medication into a 3ml syringe The correct position is 90° to the muscle.
- Ensure that there is no air in the syringe.
- Insert needle to the hub & inject.

Minor Allergic Reactions

- Diphenhydramine hydrochloride 50 mg is a commonly chosen antihistamine, mostly used in pts w/ skin reactions
- The antihistamine is then continued in an oral form every 6 - 8 hours for 24 hours
- In severe urticarial reactions immediate subcutaneous (SC) or IM administration of 0.3 mL of a 1:1000 epinephrine solution, followed by an antihistamine
- Document on chart-Find allergen (Latex ?)

Emergencies

ALLERGY: Immediate/Anaphylaxis

General/Physiology: Immediate Allergy

Immediate/Anaphylactic – occurs in less than 1 hour, often immediately

- Previous encounter with the offending antigen.
- Usually *more rapid*, *more intense* reaction than delayed.
- Often multi-system but may be localized to skin.
- Respiratory: may see bronchospasm, and/or laryngeal edema.
- May see cardiovascular involvement.

Immediate Allergy/Anaphylaxis: Signs & Symptoms

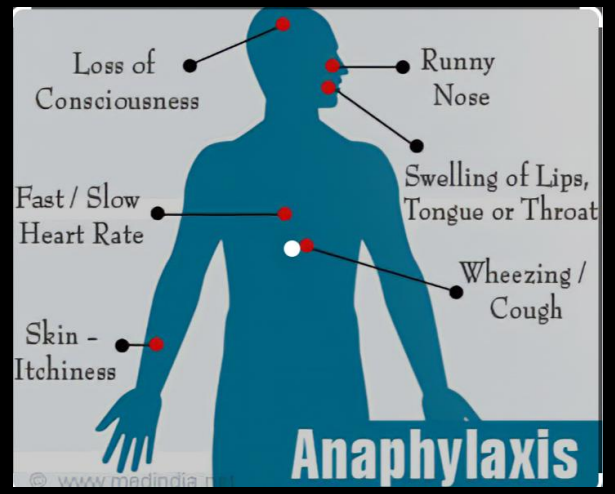
- Urticaria (HIVES)
- Pruritis (ITCHING)
- Angioedema –swelling around mouth & eyes; may be in throat and on hands & feet
- Dyspnea & wheezing
- Bronchospasm
- Syncope
- Hypotension (decreased blood pressure)

Immediate Allergy/Anaphylaxis: Management

- TAP: Position – supine *preferred* to minimize blood pressure changes, but many awake patients will want to be in upright position
- BLS, Vitals q 5 minutes as needed
- If No CV or respiratory signs, then proceed with:
  - 50 mg Benadryl® IM then oral form every 4-6 hours over a 24-hour period
  - Watch patient carefully for other signs

Immediate Allergy/Anaphylaxis: Management

If CV or respiratory signs/swelling involving the mouth or airway/bronchospasm:



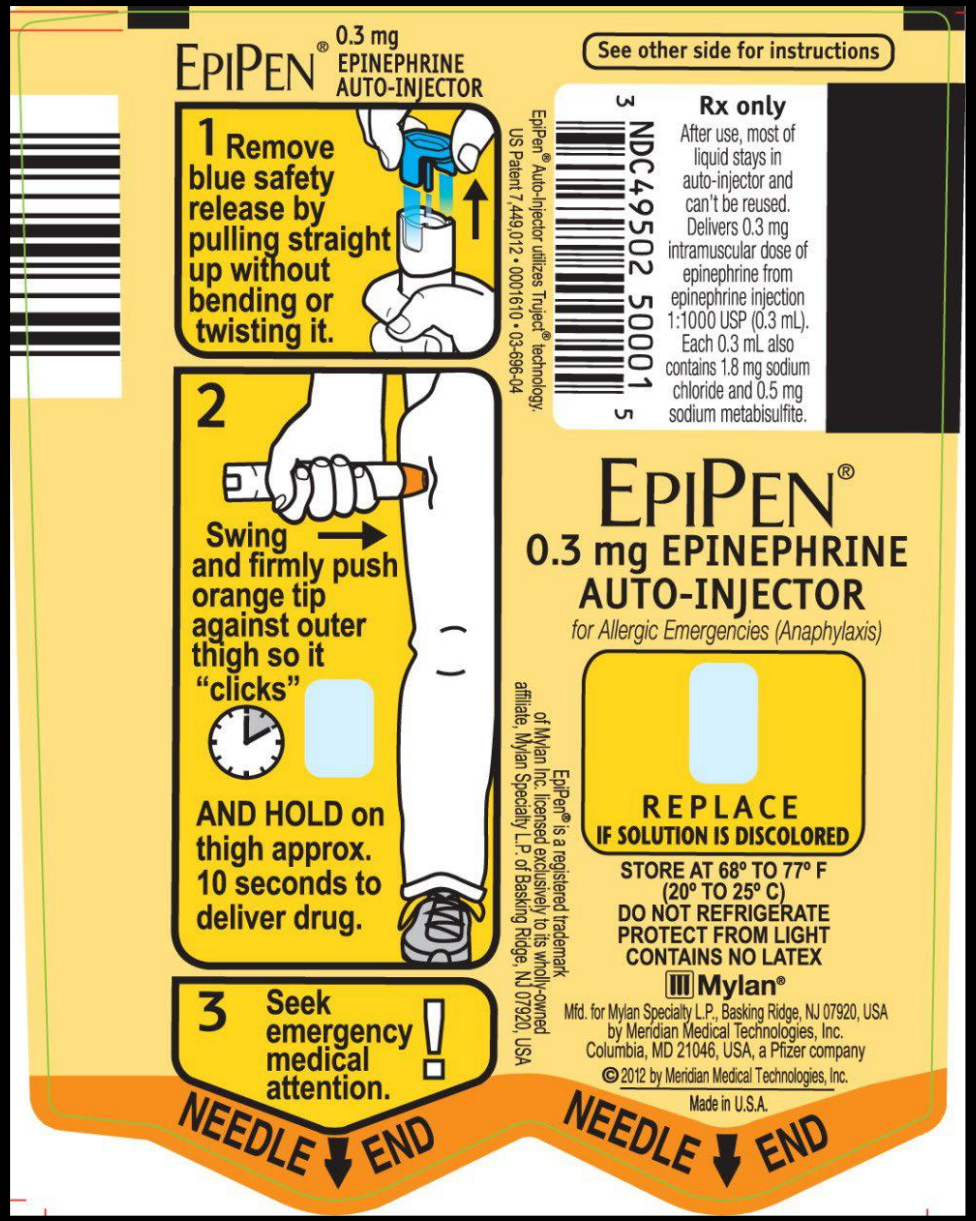
- CALL 911
- O_2~4-6 liters/min
- EpiPen® IM (adults) or EpipenJr.® IM (ages 1-8) *OR* 1:1000: 0.3 mL adult, 0.15 mL kids IM
- Consider using albuterol inhaler for respiratory distress

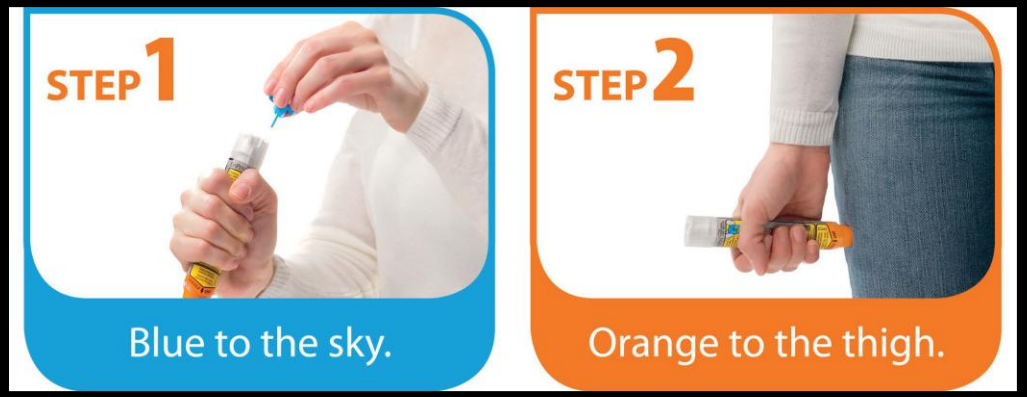
Immediate Allergy/Anaphylaxis: Management

EpiPens® (adult and child forms) are to be given as shown:

- Remove blue cap, swing
  firmly push orange tip
  against outer thigh so it clicks

- Hold on thigh ~ 10 seconds
  to deliver the drug.


EPIPEN® 0.3 mg EPINEPHRINE AUTO-INJECTOR
See other side for instructions
1 Remove blue safety release by pulling straight up without bending or twisting it.
2
Swing and firmly push orange tip against outer thigh so it "clicks"
AND HOLD on thigh approx. 10 seconds to deliver drug.
3 Seek emergency medical attention.
NEEDLE END
NEEDLE END
EpiPen® Auto-Injector utilizes Traject® technology.
US Patent 7,449,012 • 0001610 • 03-696-04
3 NDC49502 50001 5
Rx only
After use, most of liquid stays in auto-injector and can't be reused. Delivers 0.3 mg intramuscular dose of epinephrine from epinephrine injection 1:1000 USP (0.3 mL). Each 0.3 mL also contains 1.8 mg sodium chloride and 0.5 mg sodium metabisulfite.
EPIPEN®
0.3 mg EPINEPHRINE AUTO-INJECTOR
for Allergic Emergencies (Anaphylaxis)
REPLACE
IF SOLUTION IS DISCOLORED
STORE AT 68° TO 77° F (20° TO 25° C)
DO NOT REFRIGERATE
PROTECT FROM LIGHT
CONTAINS NO LATEX
Mylan®
Mfd. for Mylan Specialty L.P., Basking Ridge, NJ 07920, USA by Meridian Medical Technologies, Inc. Columbia, MD 21046, USA, a Pfizer company
© 2012 by Meridian Medical Technologies, Inc.
Made in U.S.A.
EpiPen® is a registered trademark of Mylan Inc. licensed exclusively to its wholly-owned affiliate, Mylan Specialty L.P. of Basking Ridge, NJ 07920, USA

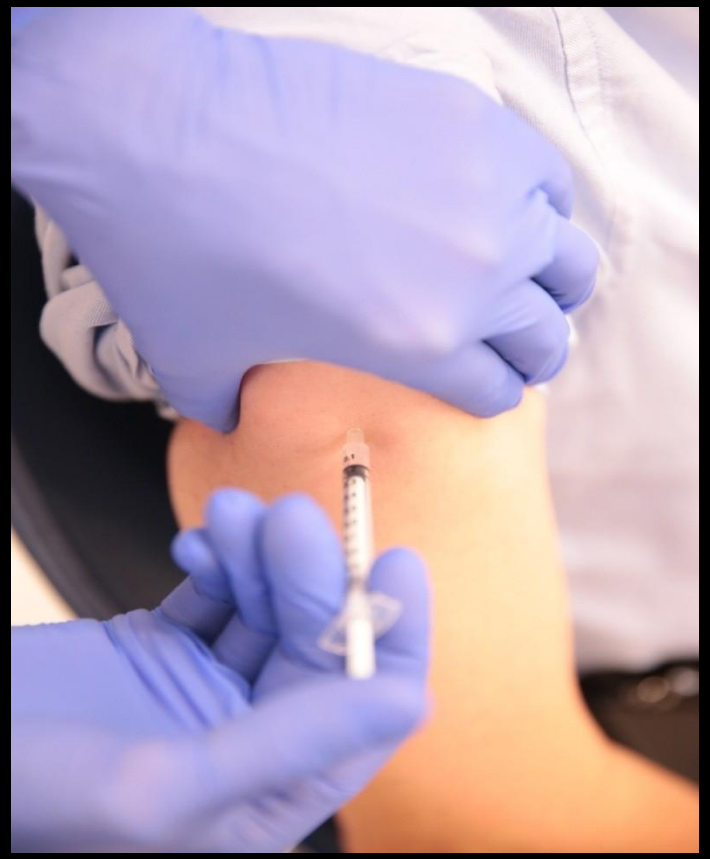

STEP 1
Blue to the sky.
STEP 2
Orange to the thigh.


EpiPen

Epi Concentration

- Epinephrine should be administered by parenteral injection of 0.3 mL of a 1:1000 solution
- The 1:1000 ampule concentration is strictly for IM use vs. the 1:10,000 concentration which is formulated for IV use only
- 1:1000 (0.3 mL adult, 0.15 mL child) given intramuscularly via a tuberculin syringe into deltoid muscle perpendicular to muscle

Immediate Allergy/Anaphylaxis: Management



<u>Alternative to EpiPen® or EpiPenJr.®</u>:

1: 1,000 (0.3 mL adult,0.15 mL child) given intramuscularly via a tuberculin syringe into deltoid muscle (perpendicular to muscle)

Manifestations and Management of Hypersensitivity (Allergic) Reactions

- The patient's vital signs should be monitored frequently for 1 hour
- If stable, the patient should be referred to a physician or emergency care facility for further follow-up
- If a patient begins to show signs of lower respiratory tract involvement (i.e., wheezing), several actions should be initiated such as possible BLS. Call 911
- The patient should be placed in a semi-reclined position & oxygen administration should begin

Manifestations and Management of Hypersensitivity (Allergic) Reactions

- Epinephrine is short acting; if symptoms recur or continue, the dose can be repeated within 5 minutes
- If epi is delivered, 911 must be called
- The patient should be transferred to the nearest emergency facility to allow further management as needed

Manifestations and Management of Hypersensitivity (Allergic) Reactions

- Many patients will claim an allergy to local anesthetics
- However, before subjecting patients to alternative forms of anesthesia, try to ensure that an allergy to the local anesthetic does exist
- In many cases patients have been told they had an allergic reaction when in fact they experienced a vasovagal hypotensive episode or mild chest palpitations

Manifestations and Management of Hypersensitivity (Allergic) Reactions

- If an allergy is truly in question, patient may require physician referral for hypersensitivity testing
- If determined that a patient has a drug allergy, the information should be displayed prominently on the patient's record in a way to alert care providers & protect patient confidentiality (HIPAA violation)

Manifestations and Management of Hypersensitivity (Allergic) Reactions

- Patients should be closely monitored for the appearance of hypotension
- Significant hypotension & thready pulse could warrant initiation of BLS if cardiac output falls below the level necessary to maintain viability or if cardiac arrest occurs

Manifestations and Management of Hypersensitivity (Allergic) Reactions

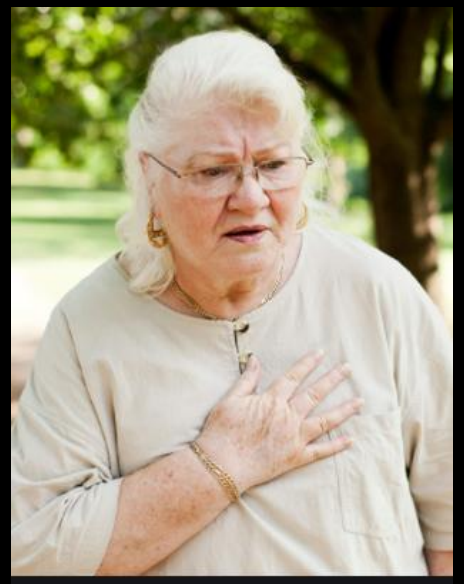
Normal airway opening

Vocal cords closed

- The usual cause of death in patients having an anaphylactic reaction is laryngeal obstruction caused by vocal cord edema-laryngospasm
- As with any potential emergency condition, prevention is the best strategy

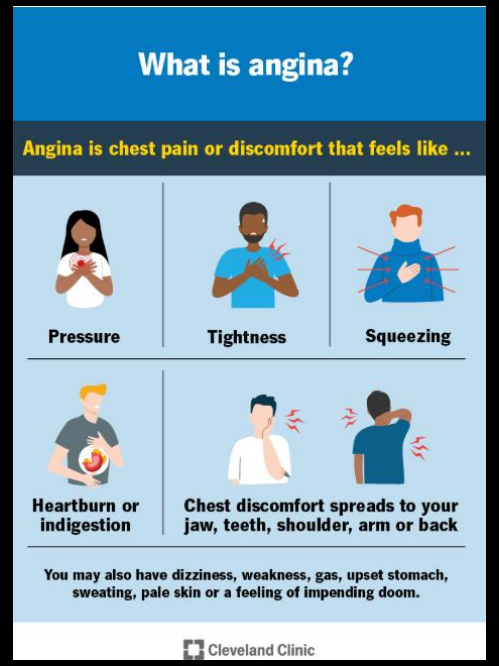
Cardiovascular Emergencies

ANGINA



- Angina is a medical term for chest pain primarily from the heart muscle not having adequate blood flow
- Usually described as pressure or tightness in the chest
- Likely to occur in pts w/ hx of CAD

Angina: Signs/Symptoms



- Chest pain: varying degrees of pain/sensation radiating
- Squeezing & Pressing
- Tightness
- Pale, Perspiring, Apprehensive

Differential Diagnosis of Acute-Onset Chest Pain

COMMON CAUSES

- Cardiovascular system: Angina pectoris, myocardial infarction
- Gastrointestinal tract: Dyspepsia (i.e. heartburn), hiatal hernia, reflux esophagitis, gastric ulcers
- Musculoskeletal system: Intercostal muscle spasm, rib or chest muscle contusions
- Psychological: Hyperventilation

Differential Diagnosis of Acute-Onset Chest Pain

UNCOMMON CAUSES

- Cardiovascular system: Pericarditis, dissecting aortic aneurysm
- Respiratory system: Pulmonary embolism, pleuritis
- Gastrointestinal tract: Esophageal rupture
- Musculoskeletal system: Osteochondritis
- Psychological: Psychogenic chest pain (i.e., imagined chest pain)

Chest Discomfort

- For patients who have chest pain are unable to remember past sensation OR who have been assured by their PCP that such discomfort does not represent heart disease- further information is useful before assuming a cardiac origin of the symptom

- Ask the patient to describe the exact location of the discomfort & any radiation, how the discomfort changes with time, and if postural position affects the discomfort

- Place patient in upright or supine position

Stable vs. Unstable Angina Pectoris

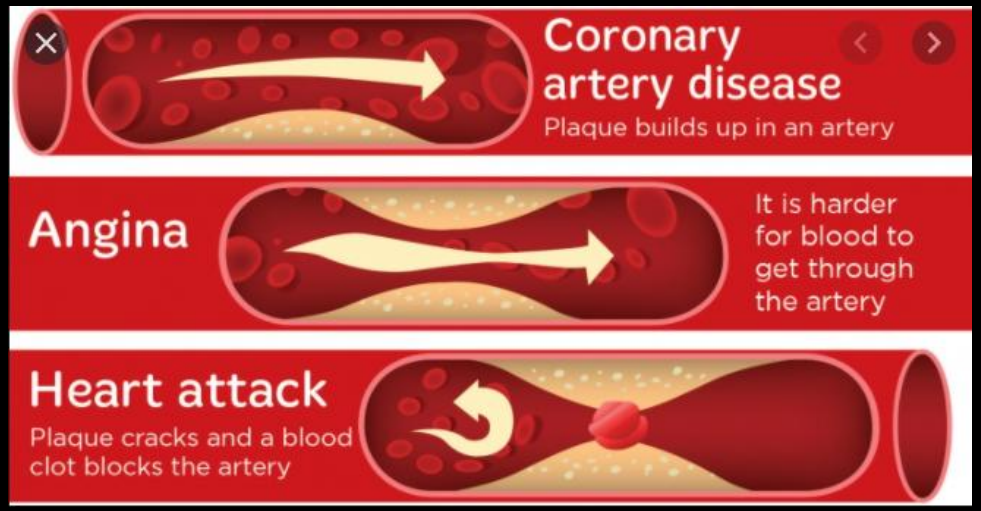
Stable

- Substernal pain triggered by exertion/stress
- Relieved by rest, vasodilator drugs (nitroglycerin)
- Pain short-lived…lasts ~1-15 minutes

Unstable

- High risk of emergency – NO DENTAL TREATMENT
- Severe, frequent, prolonged episodes, often at rest/unprovoked
- Nitroglycerin often ineffective

Physiology of Angina



- Angina is caused by temporary inadequate supply of oxygen to the heart muscle due to narrowing or blockage of the coronary arteries

- It can be associated with increased heart rate, blood pressure, possible dyspnea & arrhythmias

Angina: Management

- TAP: Position in most comfortable position for the patient (sitting or standing)
- STAT! – Nitroglycerin (NTG) 0.3 or 0.4 mg tablet under tongue *OR* spray onto or under the tongue (up to 3 doses/sprays in 15 minutes)
- O_2 – ~4-6 liters/min
- BLS as needed, record vitals
- Usual relief in ~2-4 minutes
- NTG works by relaxing vascular smooth muscle, decreasing systemic vascular resistance and decreasing the workload of the heart.

If pain resolves less than 15 minutes

- Resume treatment if fully resolved & patient feels like continuing
- Evaluate what precipitated the pain
- Modify dental treatment as needed & consider nitrous oxide sedation or other stress-reducing techniques
- Record vitals before dismissal
- If first episode, think MI!

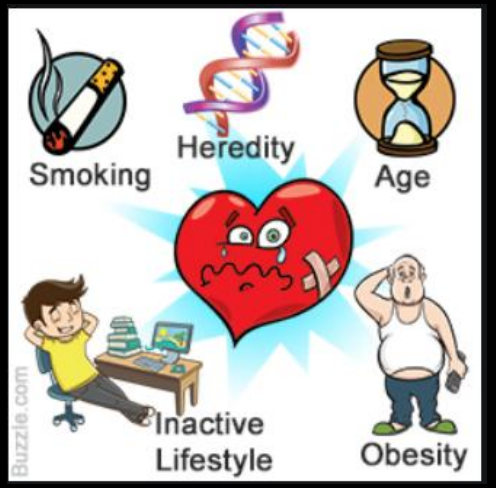
Clinical Scenario

- Pt. presents for crown cementation #19 but looks slightly pale, diastolic bp fluctuating
- Told student & colleague to reschedule patient however my colleague felt like it would be ok….
- Patient states he feels like he couldn’t breathe upon giving him local anesthetic
- Gave him oxygen, orange juice. Systolic & diastolic bp was fluctuating
- Paramedics called, suspected angina. Unable to finish appointment, waste of chair time & unproductive appointment!

CV Emergencies

MYOCARDIAL INFARCTION (MI)

Physiology - Myocardial Infarction



- MI is the result of one or more completely blocked coronary arteries
- Lack of oxygen & ↓ arterial blood supply causes death to part of the heart muscles
- Patients' w/ atherosclerosis, angina, hypercholesterolemia, hypertension & sedentary lifestyle are at risk of having a heart attack

Clinical Characteristics of MI

Discomfort/Pain As Described By Patients

- Squeezing, bursting, pressing, burning, choking, or crushing
- Substernally located, with variable radiation to left shoulder, arm, or left side (or a combination of these areas) of neck & mandible
- Frequently associated at the onset with exertion, heavy meal, anxiety, or upon assuming horizontal posture
- Relieved by vasodilators, such as nitroglycerin, or rest (in the case of angina)
- Accompanied by dyspnea, nausea, weakness, palpitations, perspiration, or a feeling of impending doom (or a combination of these symptoms)

MI: Management

- TAP: Position most comfortable
- CALL 911
- BLS, monitor vitals
- Morphine (Pain Control)
- Oxygen ~4-6 liters/min
- Nitroglycerin sublingual (1-2 pills q 5 minutes)
- Aspirin – *chew* 81 mg (2-4 tablets)
- Consider 35 – 50% *nitrous oxide for pain relief until additional help arrives.*
- Goal for MI management- keep patient comfortable & as pain-free as possible until paramedics arrive

Chest Discomfort

- If chest discomfort is suspected to be caused by MI or if that possibility cannot be ruled out, measures should be instituted that decrease myocardial work & increase myocardial oxygen supply
- All dental care must be stopped, even if the procedure is only partially finished
- Oxygen administration is started & nitroglycerin is administered sublingually or oral spray
- The patient should be reassured that everything is under control while vital signs are obtained

Chest Discomfort

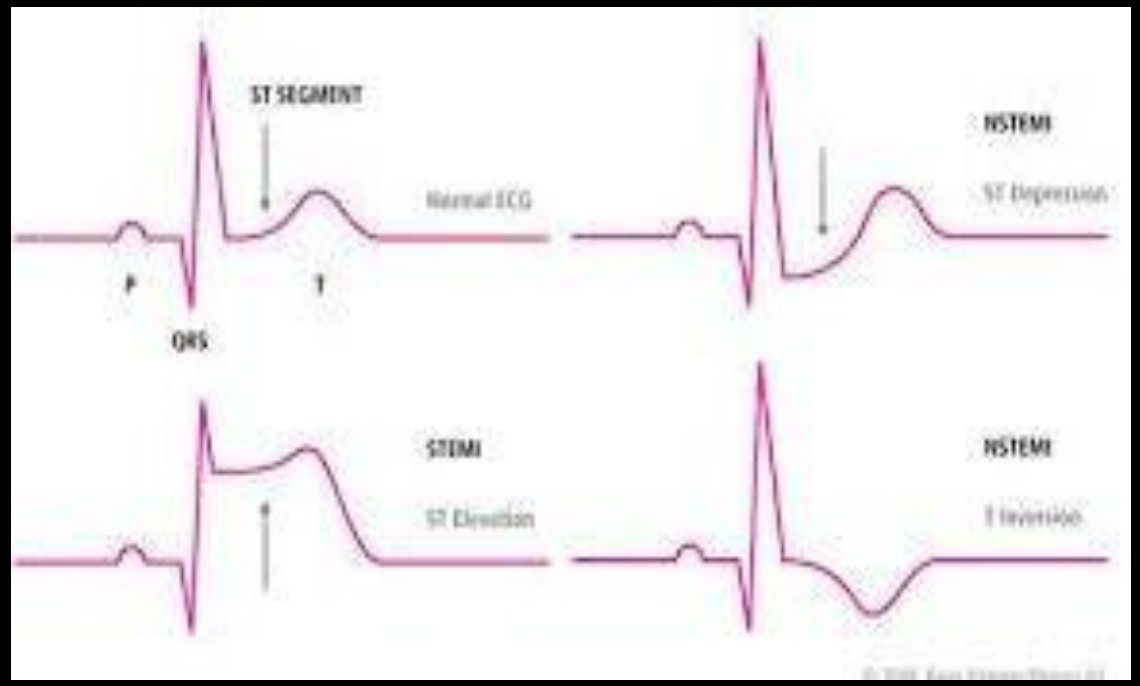
- Administer morphine sulfate (4 to 6 mg) intramuscularly or subcutaneously to alleviate pain and decrease anxiety
- Morphine is also advantageous for patients experiencing pulmonary edema
- Prompt transfer to a hospital is essential, as thrombolytic therapy and/or angioplasty with stenting may help salvage part or all the ischemic myocardium

Chest Discomfort

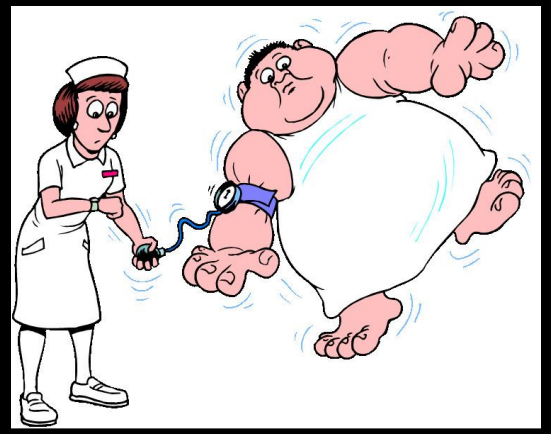
- If vital signs remain normal, chest discomfort is relieved & amount of NTG required to relieve the discomfort was more than normally necessary for that patient, then pt. should be discharged with plans for future procedures to be done in a hospital setting per physician consult.

- Other common condition that can occur with chest discomfort is anxiety

- Anxiety may be difficult to differentiate from cardiogenic problems without the use of monitoring devices not commonly present in the dental office



- Treat angina and MI the same
- A true MI episode needs to be established via 12 lead EKG lead
- ST elevation is indicative of MI, STEMI

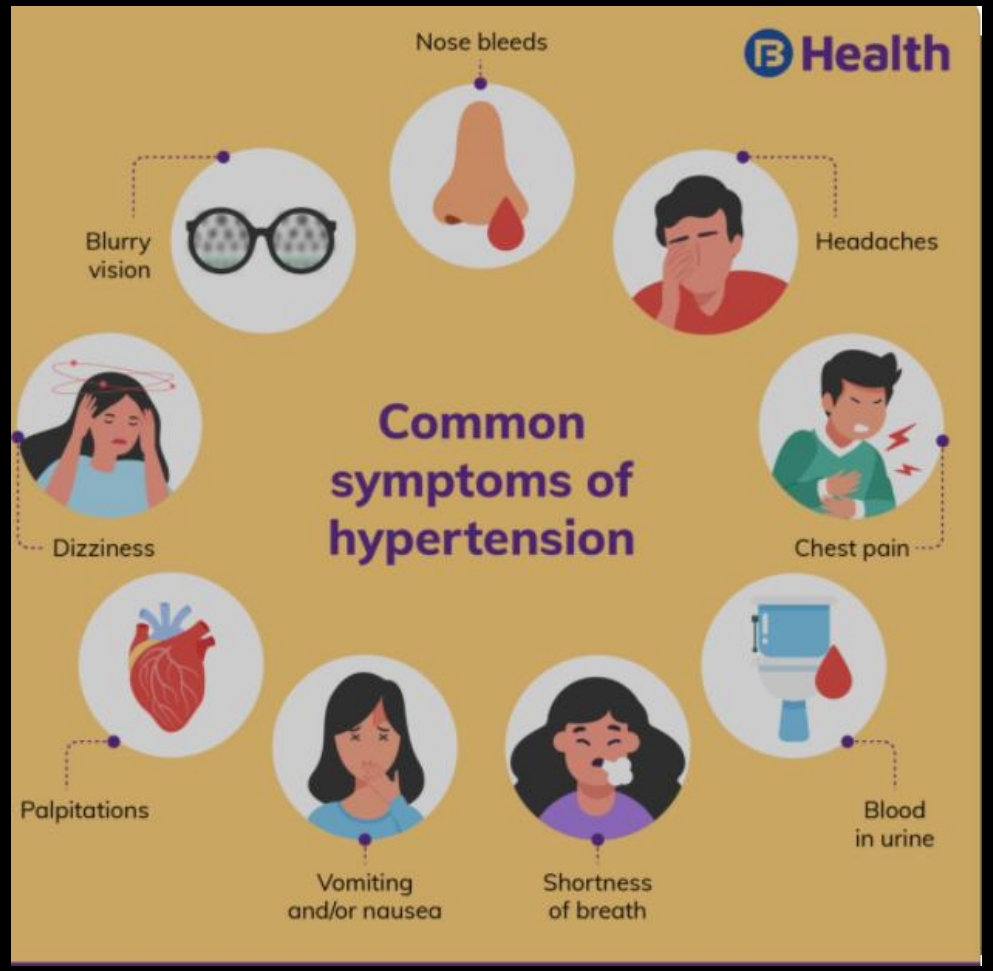


Hypertension (HTN)

- Usually stress/pain related
- Check BP and record 3 times use manually if needed. Repeat q 5minutes, if high cancel tx
- If reading is 180/120 likely HTN Urgency
- Consider future treatment under sedation, anxiety ↑ BP

Symptoms

- Headache, Chest Pain
- Apprehension
- Pale & Perspiring
- Blurred Vision, Dizziness
- Nosebleeds
- Decreased Urine Output



BP Ranges Necessitating Medical Referral, Emergency Referral, or Re-evaluation

- BP readings **≥180/120: defer elective treatment; refer to physician as soon as possible; if patient is symptomatic, refer immediately to urgent care**
- BP readings **≥160/100 but <180/120:** proceed w/dental treatment cautiously (no anesthesia) depending on procedure NO Sx recommended; consider monitoring BP during procedure: **refer patient to physician for appointment within 1 month.**
- BP readings ≥140/90 but <160/100: **proceed with dental treatment but encourage patient to see physician for evaluation.**
- BP readings <120/80: **no contraindications to elective dental treatment.**

American Heart Association

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)	and/or	DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

- **Systolic blood pressure** (the first number) – indicates how much pressure your blood is exerting against your artery walls when the heart beats.
- **Diastolic blood pressure** (the second number) – indicates how much pressure your blood is exerting against your artery walls while the heart is resting between beats.

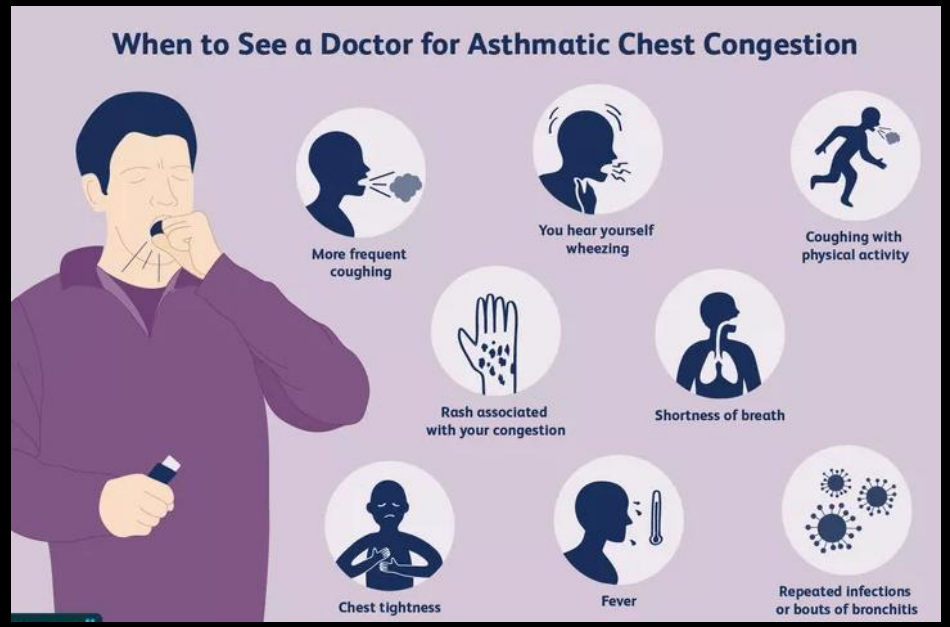
Respiratory Emergencies

Asthma

Hyperventilation

COPD

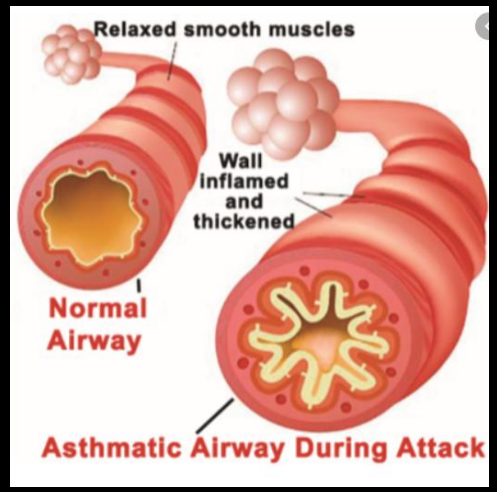
Asthma



- Patients with a history of asthma can be a particular challenge to manage safely if emotional stress or pharmacologic agents easily trigger their respiratory problems
- Most patients with asthma are aware of the symptoms that signal the onset of bronchospasm
- Patients will complain of shortness of breath and want to sit erect

Asthma

- Wheezing is usually audible; tachypnea and tachycardia begins & patients start using their accessory muscles of respiration
- As bronchospasm progresses, patients may become hypoxic and cyanotic, with eventual loss of consciousness
- Management should start with placing patients in an upright or semi reclined position



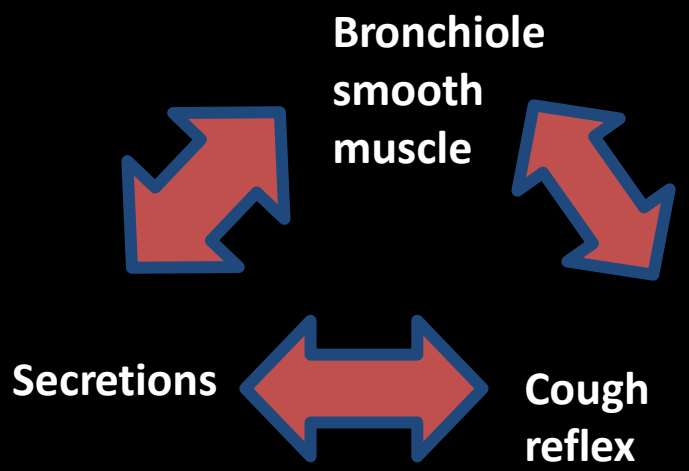
- Bronchospasm/ bronchial spasm is a sudden constriction of the muscles in the walls of the bronchioles
- Mild-severe breathing difficulty seen in pts
- Albuterol is used to treat bronchospasm in acute asthmatic situations & allergic reactions primarily manifest as respiratory issues.
- Have pt. bring their inhaler to appointments

Physiology: Asthma

- Extrinsic asthma (Most Common)
  - Allergic
  - Airborne: house dust, feathers, animals
  - Food, drugs

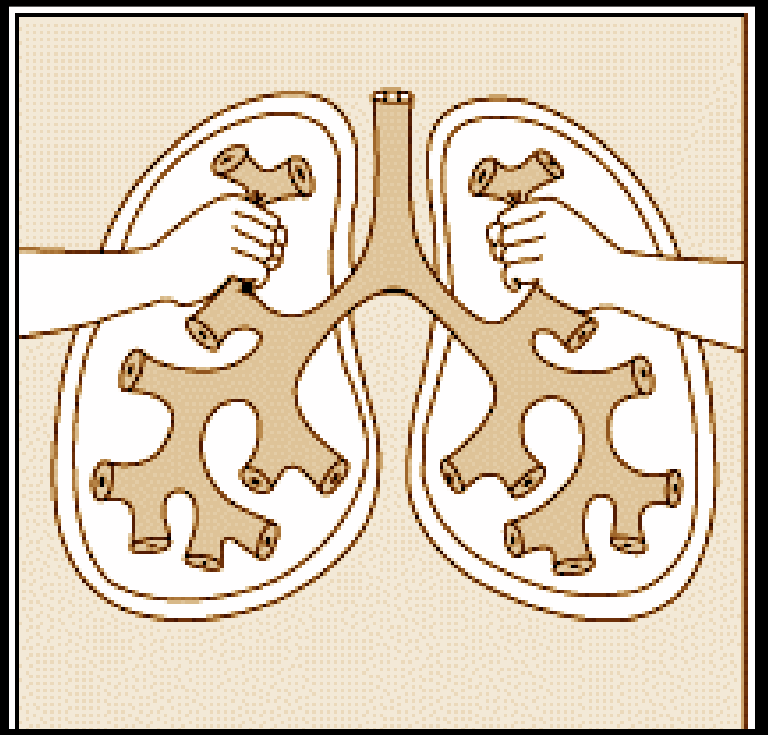
  - Children/younger adults

- Intrinsic asthma
  - Non-allergic
  - Viral respiratory infections, exertion, environmental, stress
  - Older than 35



Asthma: Signs/Symptoms

- Smooth muscle spasm in airway
- Edema
- Mucous hyper-secretion
- Coughing
- Wheezing/dyspnea, w/ varying severity and duration (minutes to hours)



Asthma

- Patients should then administer bronchodilators, using their own inhalers or one provided from the office emergency supply ~1-2 puffs q 4-6 hrs.

- The inhaler may contain epinephrine, isoproterenol, metaproterenol, or albuterol

Asthma

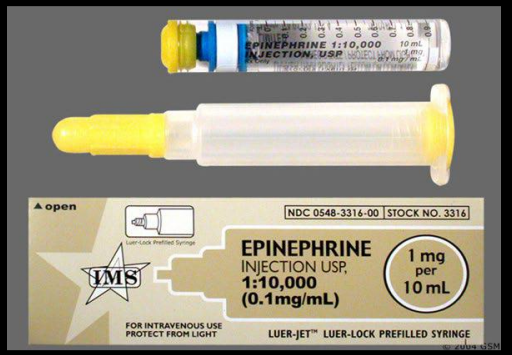
- Repeated doses should be administered cautiously to avoid overdosing the patient
- Oxygen administration should follow, using nasal cannula or a face mask
- In more severe asthmatic episodes or when aerosol therapy is ineffective, epinephrine (0.3 mL of a 1:1000 dilution) may be injected SC or IM

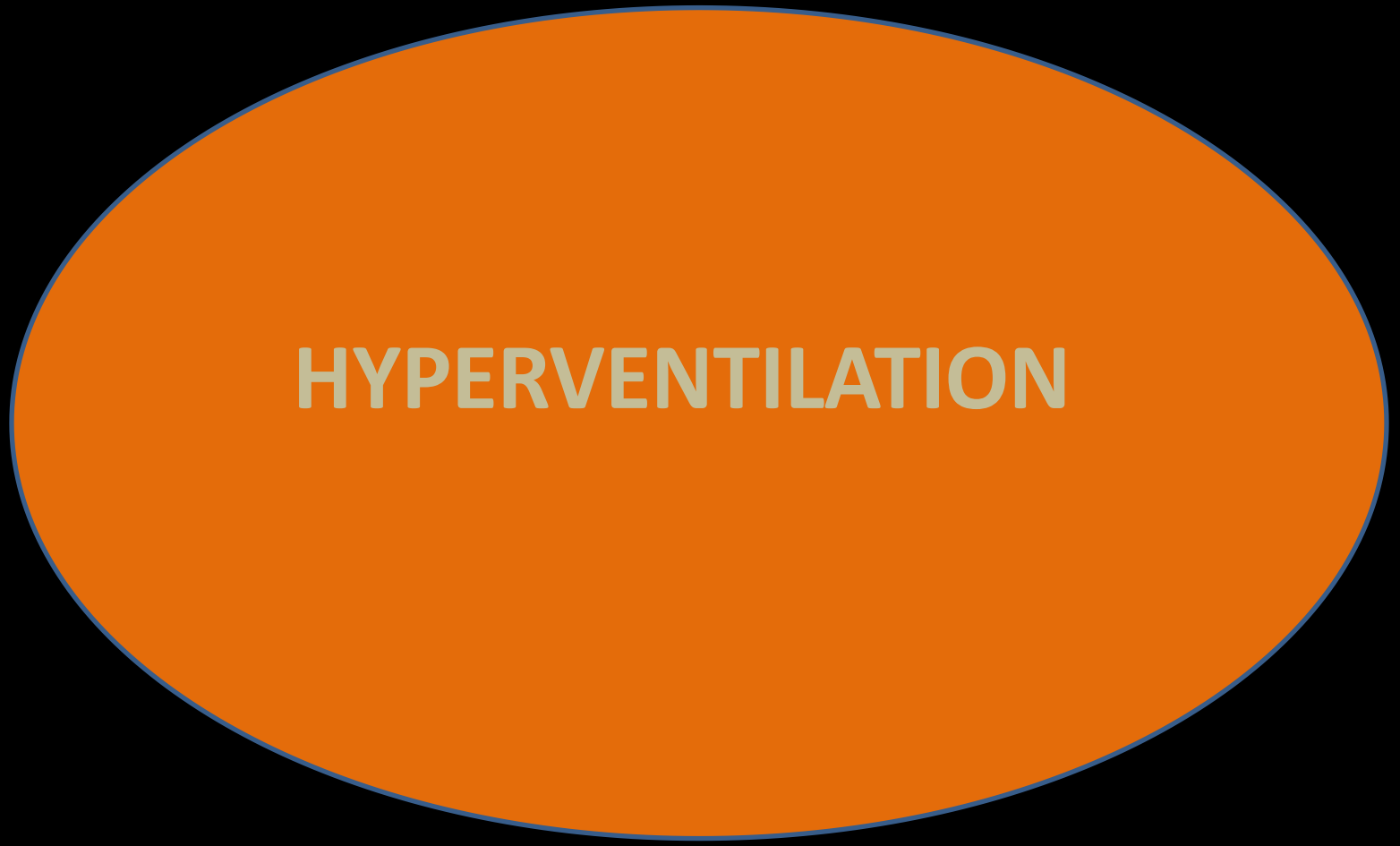
Asthma: Management

If Albuterol *NOT* effective

- Call 911
- Consider giving EpiPen®(0.3mg) adults, EpiPen Jr.® (0.15mg) kids; repeat if needed

- Discharge to paramedics



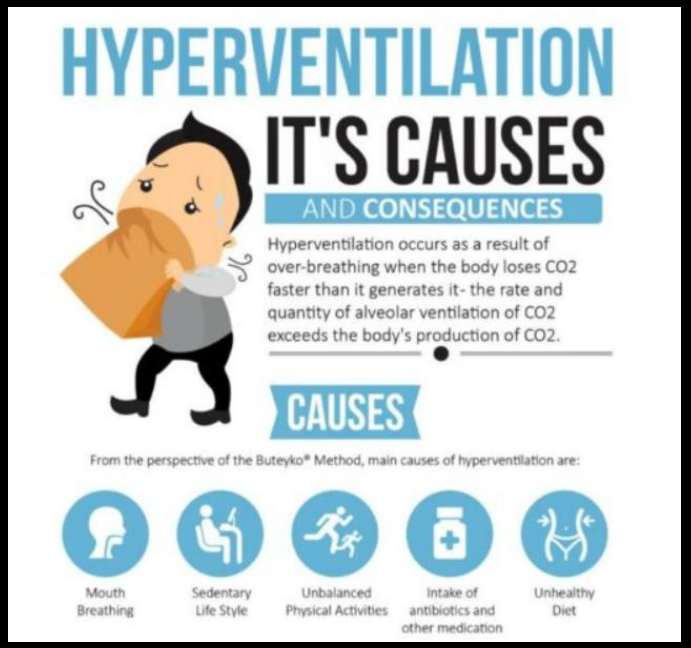

HYPERVENTILATION

Hyperventilation

- Most frequent cause of respiratory difficulty in the dental office is anxiety that is expressed as hyperventilation
- Frequently seen in patients in their teens, 20s & 30s. Can be prevented through anxiety control
- Dentists should be attuned to the signs of patient apprehension & through the initial exam should encourage patients to express their concerns
- These patients should be managed with an anxiety-reduction protocol

Hyperventilation

- The first manifestation of hyperventilation is frequently a complaint of an inability to get enough air
- Rapid respirations seen, dizzy & disoriented
- The patient breathes rapidly agitated (hysteria), lack of CO2 production
- Patient hardly every loses consciousness- good sign



Hyperventilation

- In extreme cases, pt. may become alkalotic (pH >7.5) & complain of being light-headed
- Possible tingling sensation in the fingers, toes & perioral region; may even develop muscle twitches or convulsions.
- Carpopedal spasm
- Eventually loss of consciousness occurs

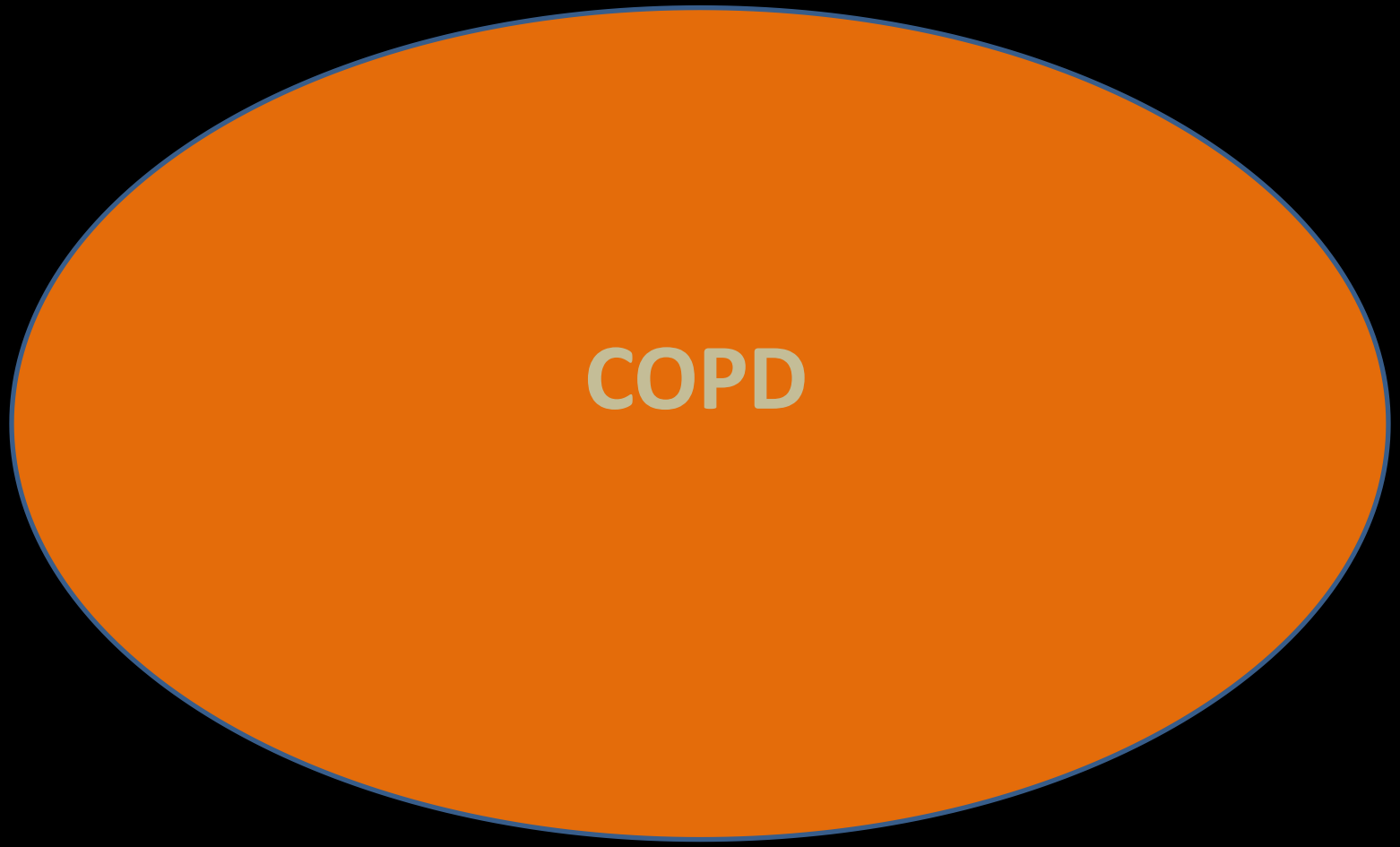
Hyperventilation

Management of a hyperventilating patient involves:

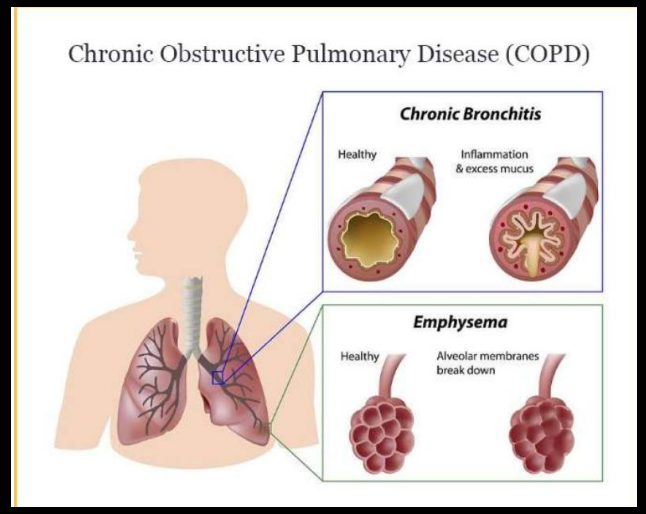
- Terminating the surgical procedure
- Positioning the patient in a semi-erect position, do NOT administer Oxygen!
- Providing reassurance

Hyperventilation

- Patient may also be instructed to cup hands over face to increase carbon dioxide (no need to use paper bag) & relieve anxiety
- Oxygen-enriched air is not indicated, monitor O_2
- Rarely a medical problem, remove stressful activities


COPD

Chronic Obstructive Pulmonary Disease (COPD)



- Lung condition with common symptoms such as difficulty breathing , tightness of chest with wheezing and severe cough
- Patients who are heavy smokers have a high chance of developing COPD
- Nearly 15-20 million individuals are estimated to be diagnosed with COPD in the United States –Halo

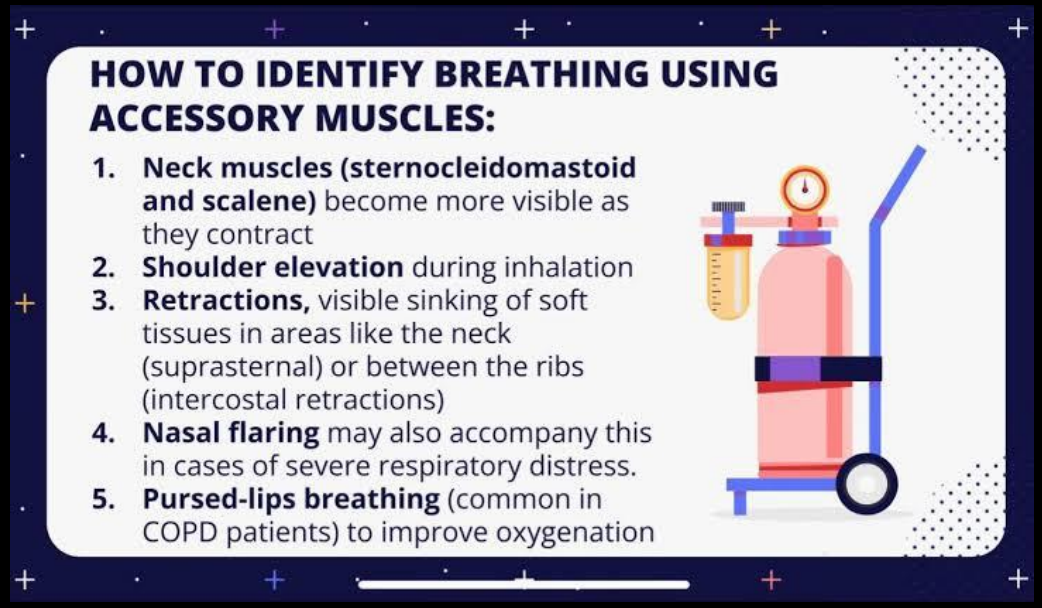
COPD

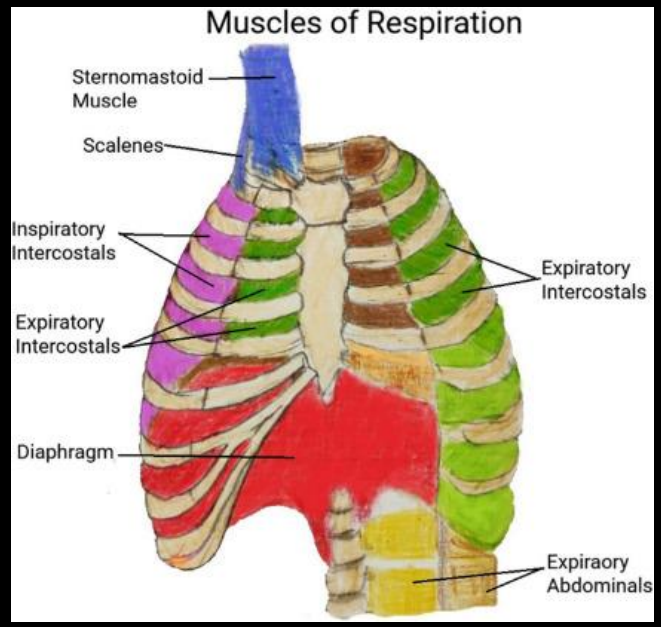
- Patients with well-compensated COPD can have difficulty during oral surgery
- Many of these patients depend on maintaining an upright posture to breathe adequately
- Many of these patients have trouble if placed in an almost supine position or given high-flow nasal oxygen

COPD

- COPD patients have a difficult time sitting in an upright or supine position
- These patients are used to having high arterial CO2 levels and use a low level of blood oxygen as the primary stimulus to drive respirations

COPD





- Why do COPD patients have a difficult time sitting upright?

- Relying on their accessory muscles of respiration to breathe such as the diaphragm and external intercostal muscles
- Lying supine interferes with the use of these accessory muscles; therefore, patients will usually ask or struggle to sit up before problems resulting from positioning occur
- Excessive lung secretions that are more difficult to clear when supine also accompany COPD

COPD

- Administering too much oxygen to a patient vulnerable to COPD can lead to a decreased respiratory rate, resulting in cyanosis, and possible apnea
- The appropriate response is to stop oxygen delivery before apnea develops, which should lead to an improvement in the respiratory rate
- If apnea does occur and the patient becomes unconscious, artificial ventilation should be started immediately and emergency help called

Emergencies

ASPIRATION

Foreign-Body Aspiration

- Aspiration of foreign bodies into the airway represents a significant risk during dental treatments
- This risk is heightened when the patient is positioned supine or semi-upright in the dental chair or is sedated to the extent that the gag reflex is diminished
- Objects that enter the hypopharynx are often swallowed and typically pass safely through the gastrointestinal system

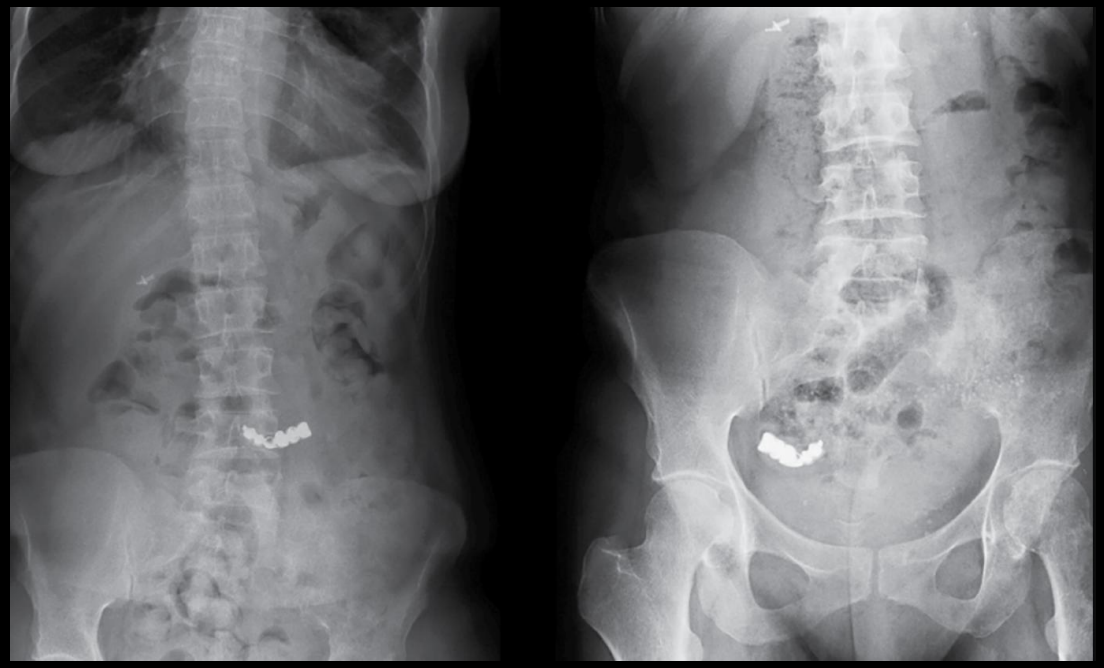
Foreign-Body Aspiration

- Recommended to get chest and abdominal radiographs to eliminate the possibility of asymptomatic aspiration into the respiratory tract
- Occasionally, the foreign object aspirates into larynx, where violent coughing will ensue that may expel the aspirated material
- However, larger objects aspirated may obstruct the airway and become lodged in such a manner that coughing is ineffective because the lungs cannot be filled with air before the attempted cough

Foreign-Body Aspiration

- Patients who aspirate typically are unable to vocalize and often experience significant anxiety
- Cyanosis develops rapidly, followed by a loss of consciousness
- Management of aspirated foreign bodies largely depends on the severity of airway obstruction

Foreign-Body Aspiration



- Abdominal X-ray showing the dental bridge lying in the stomach a couple of hours after ingestion (left) and moved onto the terminal ileum a week later

Vecchio R, Intagliata E (2017) Accidental Ingestion of a Dental Bridge. Clin Med Rev Case Rep 4:181. doi.org/10.23937/2378-3656/1410181

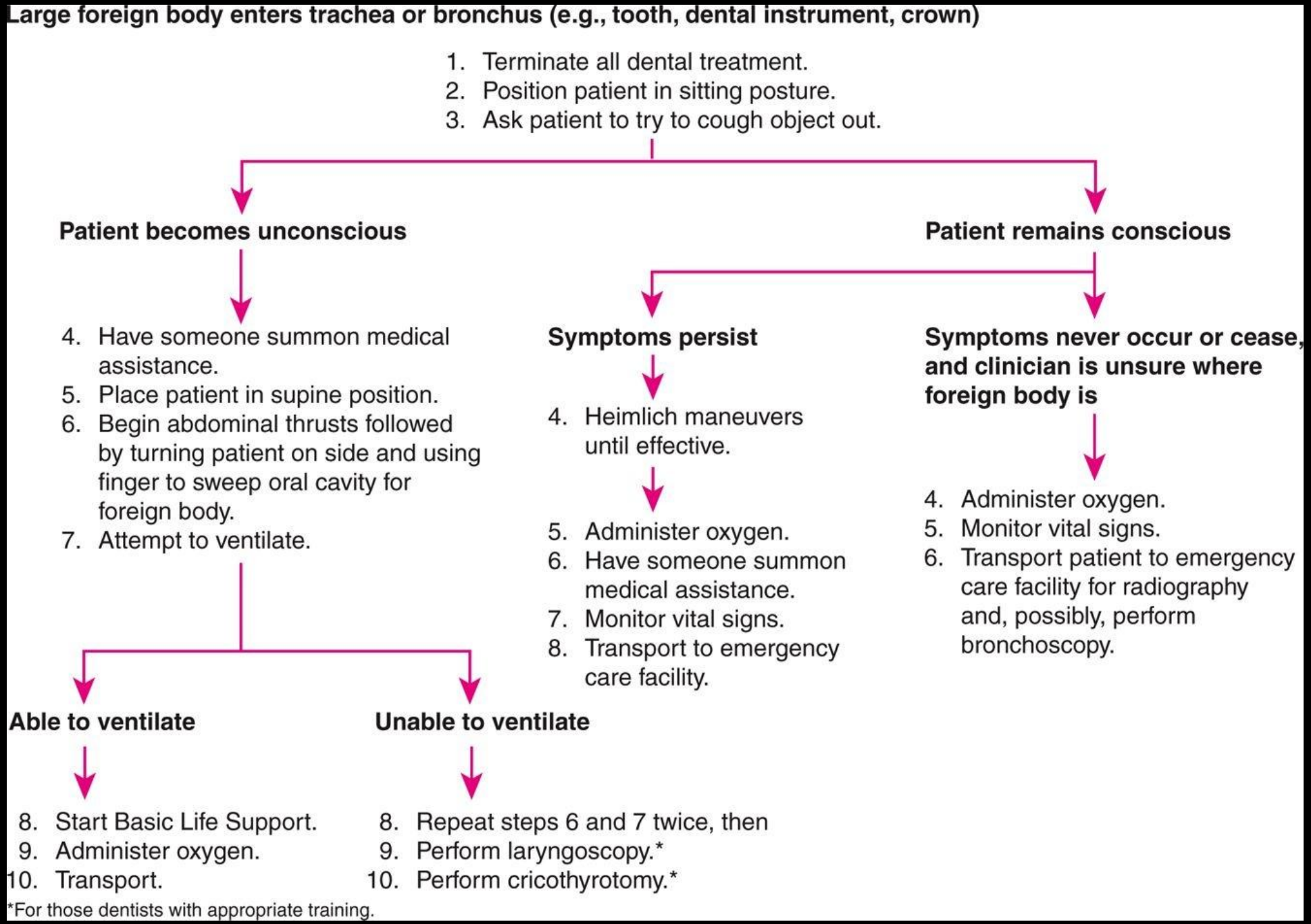
tion

Management

- Patients who retain rtially obstructed airway should be encouraged to t ghing
- For patients who ar bdominal thrusts or Heimlich maneuvers should successfully removed
- If the obstruction c ld receive supplemental oxygen and be promptly tra for laryngoscopy or bronchoscopy

Foreign-Body Aspiration

- If the patient is not exchanging air, BLS should be started
- If air cannot be blown into the lungs, additional abdominal thrusts should be attempted, followed by oral finger sweeps and BLS
- If several attempts to relieve the obstruction fail, an emergency cricothyrotomy may be necessary
- Dentists trained in laryngoscopy can investigate the larynx and use Magill forceps to try to remove any foreign material


Large foreign body enters trachea or bronchus (e.g., tooth, dental instrument, crown)
1. Terminate all dental treatment.
2. Position patient in sitting posture.
3. Ask patient to try to cough object out.
Patient becomes unconscious
Patient remains conscious
4. Have someone summon medical assistance.
5. Place patient in supine position.
6. Begin abdominal thrusts followed by turning patient on side and using finger to sweep oral cavity for foreign body.
7. Attempt to ventilate.
Symptoms persist
4. Heimlich maneuvers until effective.
5. Administer oxygen.
6. Have someone summon medical assistance.
7. Monitor vital signs.
8. Transport to emergency care facility.
Symptoms never occur or cease, and clinician is unsure where foreign body is
4. Administer oxygen.
5. Monitor vital signs.
6. Transport patient to emergency care facility for radiography and, possibly, perform bronchoscopy.
Able to ventilate
Unable to ventilate
8. Start Basic Life Support.
9. Administer oxygen.
10. Transport.
8. Repeat steps 6 and 7 twice, then
9. Perform laryngoscopy.*
10. Perform cricothyrotomy.*
*For those dentists with appropriate training.

Prevention

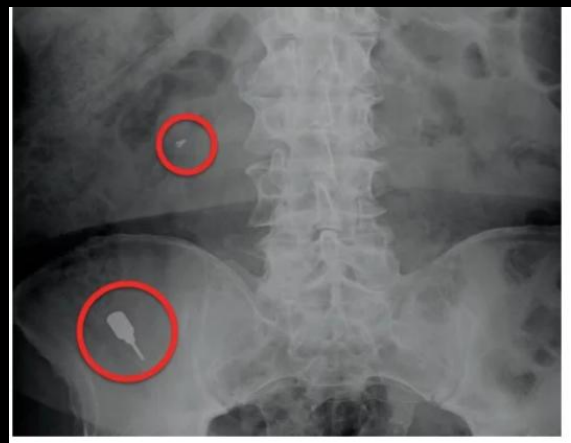


Figure 2 (left): Chest radiograph showing ingested cover screw into the duodenum and implant driver into the terminal ileum; Figure 3 (right): Throat pack — 4 x 4 is placed posterior to the area of treatment to provide a barrier from foreign body loss

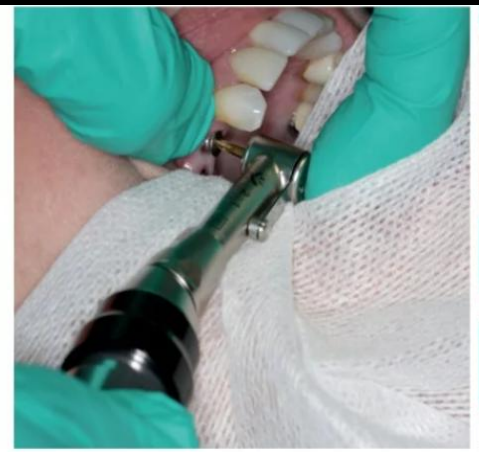


Figure 4 (left): Ligatures — floss tied to direction indicators to facilitate easy removal from the oropharynx; Figure 5 (right): EasyReach Prosthetic Wrench (Salvin®): Specially designed implant drivers allow for insertion and removal of screws

https://implantpracticeus.com/dr-randolph-r-resnik-director-of-the-misch-international-implant-institute/

- The above information was provided by Implant Practice US on Ingestion and Aspiration of Dental Components presented by Dr Resnik

Gastric-Contents Aspiration

- Aspiration of gastric contents into the lower respiratory tract can lead to serious respiratory difficulties
- The particulate matter in gastric contents causes physical obstruction of pulmonary airways, but the high acidity of gastric material can cause more serious problems
- The low pH of gastric juice necrotizes pulmonary tissue it contacts, and respiratory distress syndrome occurs with transudation of fluid into pulmonary alveoli and a loss of functioning lung tissue

Gastric-Contents Aspiration

- This occurs in patients who are sedated with a depressed gag reflex
- The sedated or unconscious patient who aspirates a significant amount of gastric material will show signs of respiratory difficulty, such as tachypnea & wheezing
- Tachycardia and hypotension may soon occur, and as ventilatory capability worsens, cyanosis appears

Gastric-Contents Aspiration

Management

- Detailed instructions need to be given to patients to avoid eating or drinking for 8 hours before any oral surgery appointment involving any sedation
- A deeply sedated or unconscious patient who vomits immediately placed into a head-down, feet-raised position and turned onto the right side
- The patient should be placed on supplemental oxygen and vital signs monitored
- Immediate transportation to an emergency facility is mandatory

Emergencies

SYNCOPE

Syncope Physiology

- Sudden ↓ in blood supply to the brain
- Dramatic decrease in systolic blood pressure
- “Fight or flight” response is initiated due to fear, but patient never moves, leading to the fainting episode

Vasovagal Syncope

- The most common cause of a transient loss of consciousness in the dental office is vasovagal syncope

- This generally occurs because of a series of cardiovascular events triggered by emotional stress brought on by the anticipation of or delivery of dental care

igns/Symptoms

Vasovagal Syncope

- Once consciousness is regained, the patient may have pallor, nausea & weakness for several minutes
- Prevention of vasovagal syncopal reactions involves proper patient preparation
- The extremely anxious patient should be treated by using an anxiety-reduction protocol &, if necessary, should be given anxiolytic drugs before treatment

Vasovagal Syncope

- Any signs of an impending syncopal episode should be quickly treated by placing the patient in a supine position or a position in which legs are elevated above the level of the heart
- Placing a cool, moist towel on the forehead can help relax pt.
- If the patient is slow to recover consciousness, a respiratory stimulant such as aromatic ammonia may be useful

Syncope: Management

- TAP: Position supine with feet elevated
- Ammonia inhalant vaporole: break open under patient's nose
- O_2 ~4-6 liters/min if needed
- BLS - Assess vitals every 5 minutes
- Call 911- if no recovery after BLS is initiated (~3-5 minutes) *or* incomplete recovery after 10-15 minutes (vitals abnormal, unable to maintain consciousness in upright position, unable to ambulate without assistance, etc.)

Orthostatic Hypotension

- Another common cause of a transient altered state of consciousness in the dental setting is orthostatic (or postural) hypotension
- This problem occurs because of pooling of blood in the periphery that is not remobilized quickly enough to prevent cerebral ischemia when a patient rapidly assumes an upright posture
- The patient will therefore feel light-headed or become syncopal

Orthostatic Hypotension

- Patients with orthostatic hypotension who remain conscious will usually complain of palpitations & generalized weakness
- Once symptoms disappear, patients can generally sit up slowly & sit on the edge of the chair for a few moments before standing
- The longer the appointment goes the chances are greater especially in older pts

Management of Orthostatic Hypotension

- Terminate all dental treatment
- Position patient in supine posture, with legs raised above the level of the head
- Monitor vital signs
- Once blood pressure improves, slowly return patient to sitting posture
- Discharge patient to home once vital signs are normal and stable
- Obtain medical consultation before any further dental care

Emergencies

Local Anesthetic Toxicity

Local Anesthetic (LA) Toxicity

- Toxicity reactions arise when the local anesthetic leads to an excessively high serum concentration
- Preventing toxicity reactions to local anesthetics typically involves multiple considerations
- The administered dose should be the minimum amount of local anesthetic needed to achieve the desired intensity & duration of pain control sufficient to complete the surgical procedure

Local Anesthetic (LA) Toxicity

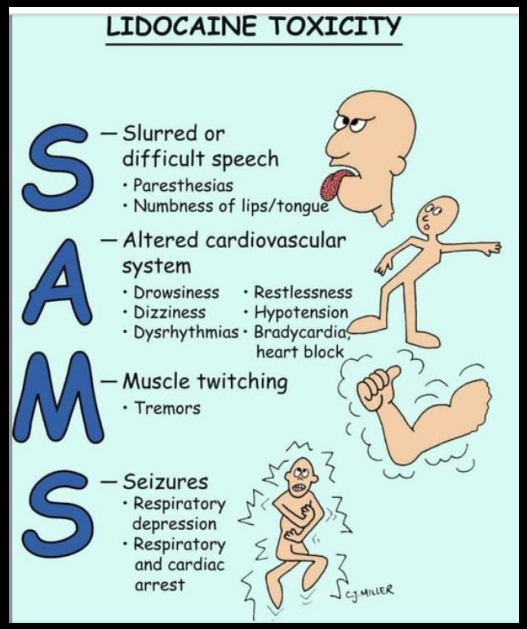
- The patient's age, lean body mass, liver function, and history of problems with LA must be considered when choosing the dose of local anesthesia
- Another factor to consider in preventing an overdose reaction is the manner of drug administration
- The dentist should give the required dose slowly, avoiding intravascular injection, and use vasoconstrictors to slow the entry of local anesthetics into the blood

Local Anesthetic (LA) Toxicity

Recommended Maximum Dosage

- **The maximum doses apply to healthy individuals. The highest allowable dose of epinephrine per appointment is 0.2 mg**

DRUG	COMMON BRAND	CONCENTRATI	MAXIMUM DOSE (mg/kg)	MAXIMUM # OF 1.8mL CARTRIDGES
Lidocaine with epinephrine	Xylocaine with epinephrine	2% lidocaine 1:100,000 epi	5	10
Mepivacaine	Carbocaine	3%	5	6
Prilocaine	Citanest	4%	5	6
Bupivacaine with epinephrine	Marcaine with epinephrine	0.5% bupivacaine 1:200,000 epi	1.5	10



Local Anesthetic (LA) Toxicity

- Mild toxicity reaction may be limited to patient confusion, talkativeness, anxiety & speech slurring
- As severity of the overdose increases, patient may display stuttering speech, nystagmus, and generalized tremors
- Other symptoms such as headache, dizziness, blurred vision & drowsiness can occur
- Serious manifestations of local anesthetic toxicity are the appearance of generalized tonic- clonic seizures and cardiac depression leading to cardiac arrest

Local Anesthetic (LA) Toxicity

Management

- Monitor vital signs and advise the patient to hyperventilate moderately, with or without supplemental oxygen
- If symptoms of anesthetic toxicity persist, administer a slow intravenous dose of diazepam ranging from 2.5 to 5 mg
- Seek immediate medical assistance

Emergencies

SEIZURES

Seizure

- Idiopathic seizure disorders can range from Grand Mal seizures w/ clonic contortions of the trunk & extremities, to Petit Mal seizures that may occur with only episodic absences (e.g. blank stare)
- Although rare, some seizure disorders, such as those resulting from injury-induced brain damage or damage from ethanol abuse, have a known cause
- Usually, patients who have seizures are on antiseizure medications e.g. Phenytoin (Dilantin), Phenobarbital, or Valproic acid
- Always ask these patients-when was the last time you had a seizure, do you know when you are about to have a seizure, have you had a seizure in a dental office & if yes do you remember any events ?

Seizures

- Most seizures are generalized tonic/clonic - Grand Mal
- Excessive neuronal brain activity is occurring
- Most seizures are self-limiting & generally NOT *life-threatening*
- Main goal is to prevent injury
- Supportive management

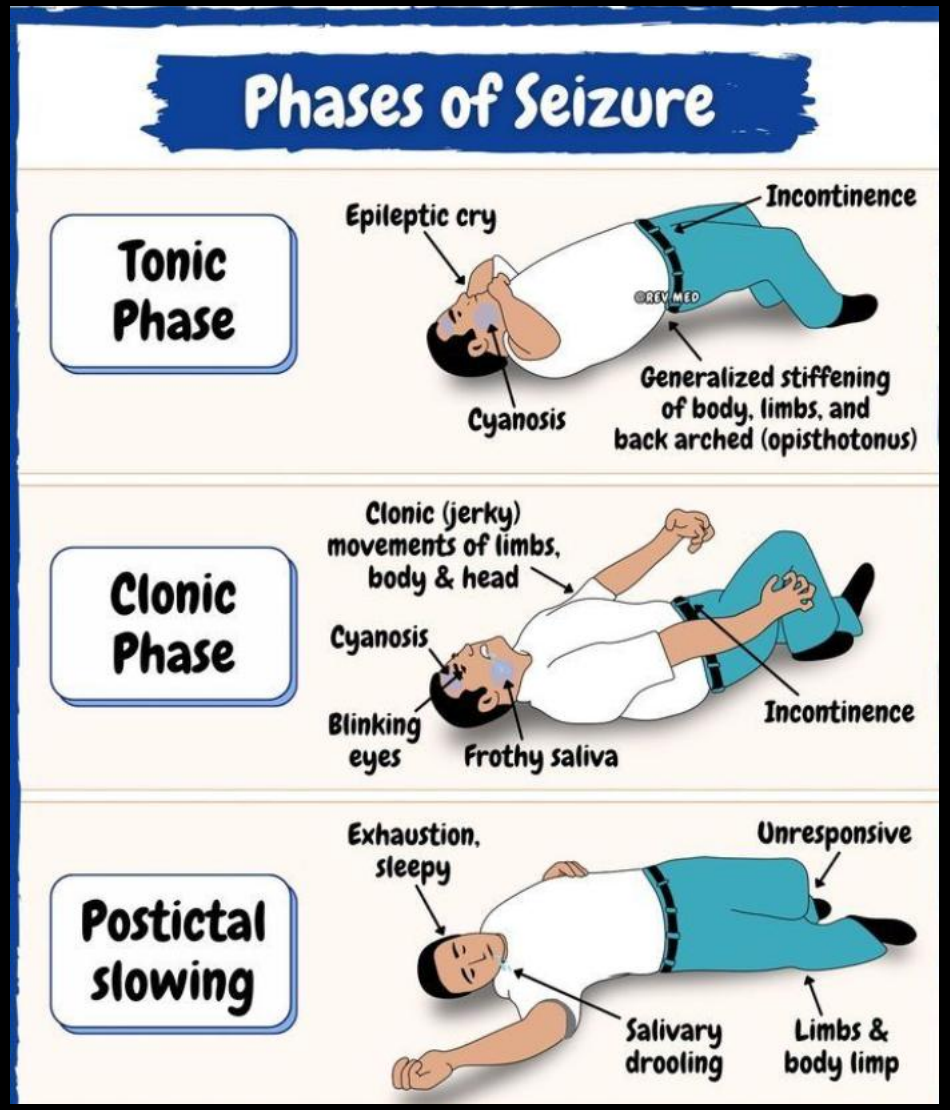
Seizure

- The occurrence of a seizure while a patient is undergoing care in the dental office is rarely an emergency that calls for actions other than simply protecting the patient from self-injury
- Management of the patient during and after a seizure varies, based on the type of seizure that occurs
- The patient's ability to exchange air must be monitored by close observation
- First time pt. experiencing a seizure in latter years is concerning (tumor?)

Grand Mal Seizures: Signs and Symptoms

Four Stages:

1. Prodromal – minutes to hours, increased anxiety, depression, aura
2. Tonic/clonic – 2-5 minutes alternating muscle contraction & relaxation; saliva accumulates; potential for tongue biting
3. Post-ictal – 5-15 minutes
   - Muscle relaxation/incontinence
   - Deep relaxation/sleep
   - Gradual consciousness, but disorientation
   - Amnesia
4. Full recovery – 2 hours



Seizure

- Placement of objects between the teeth to prevent tongue biting is hazardous & therefore unwarranted
- Continuous or repeated seizures without periods of recovery between them are known as **Status Epilepticus**
- This problem warrants notification of outside emergency assistance because it is the most common type of seizure disorder to cause mortality

Seizure: Management

PROTECT AIRWAY, PREVENT INJURY

- Terminate procedure /clear items from mouth
- Activate intra-office response system
- Position flat on floor or supine in dental chair
  - Head tilt/chin lift
  - Head to right if vomiting--suction if needed
  - NO BITE STICK!
- BLS while assessing situation/vitals
- Consider oxygen ~4-6- liters/min

Seizure: Management: Post-ictal Phase

- Post –ictal phase may be *more dangerous* due to possibility of *respiratory, CNS depression*
- Watch airway- head tilt/chin lift protocol
- Continue BLS, vitals q 5 min
- Consider O_2 ~4-6 liters/min
- Reassurance
- Discharge to paramedics

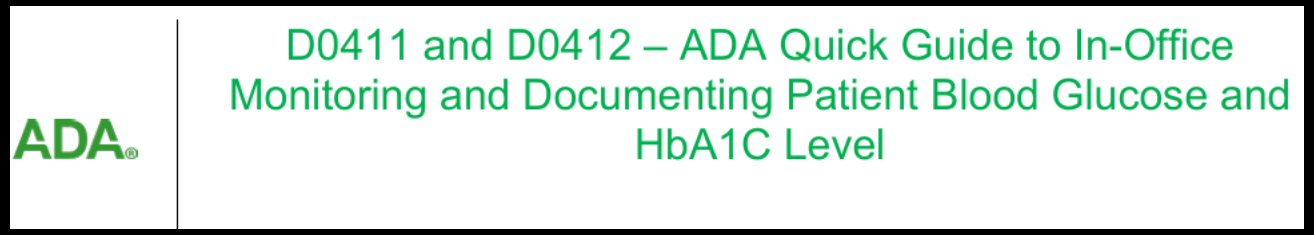
(if called) or responsible adult

- Check orientation

Emergencies

DIABETES

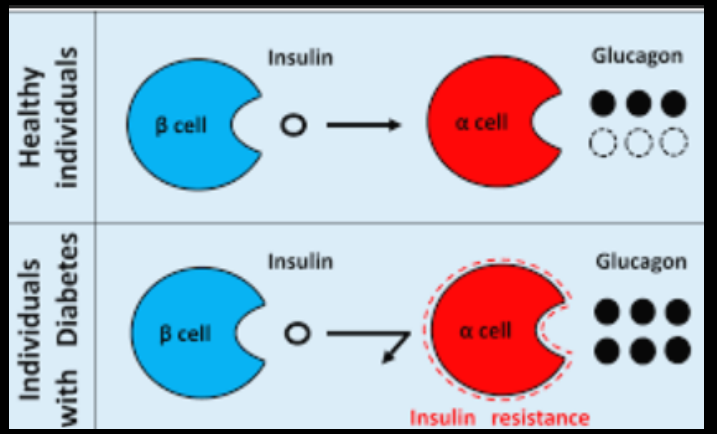
Diabetes



Why is Diabetes such an epidemic?

- Per the CDC over 30 million have diabetes while 84 million have prediabetes
- The U.S. Preventative Services recommend for patients with treated or untreated hypertension (bp >135/80mm Hg) should be screened for diabetes

Diabetes



What exactly is Diabetes

- A group of metabolic disorders leading to high blood sugar levels over time
- Disturbance in carbohydrate, fat, and protein metabolism resulting from defects in insulin secretion or insulin action
- Pancreas does not produce enough insulin, or the cells of the body do not respond properly to the insulin

Diabetes

Type 1 Diabetes Mellitus

- ”Insulin dependent diabetes mellitus” or “Juvenile diabetes”
- Pancreas does not create adequate insulin
- Autoimmune T-cell destruction of insulin which produce β cells of the pancreatic islets resulting in insulin deficiency

Diabetes

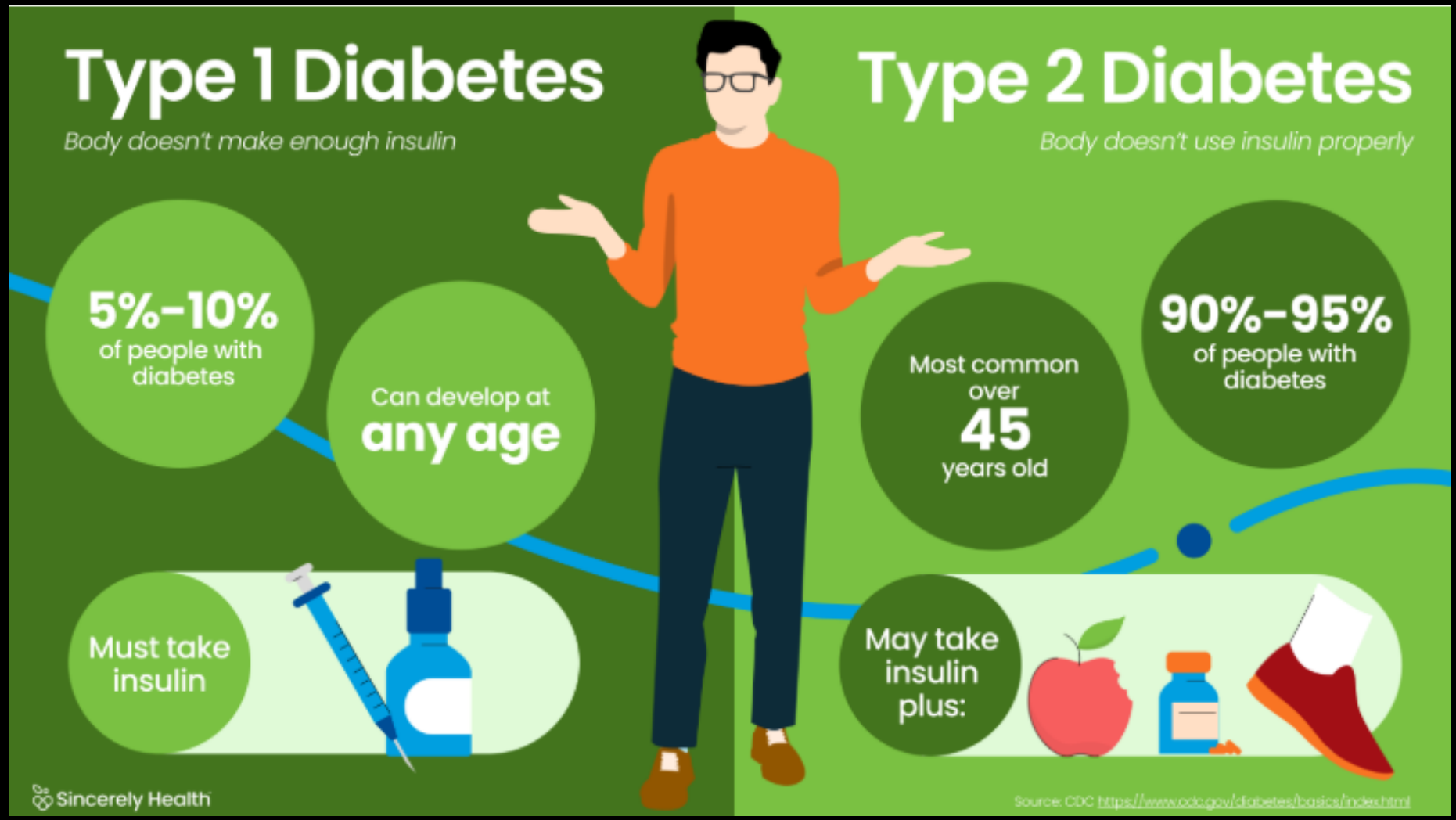
Type 2 Diabetes Mellitus

- “Non-insulin dependent diabetes mellitus” or ”Adult-onset diabetes”
- Begins with the development of insulin resistance leading in failure of cells to respond properly to insulin
- While disease progression lack of insulin is possible
- Most common cause is excessive body weight and insufficient exercise

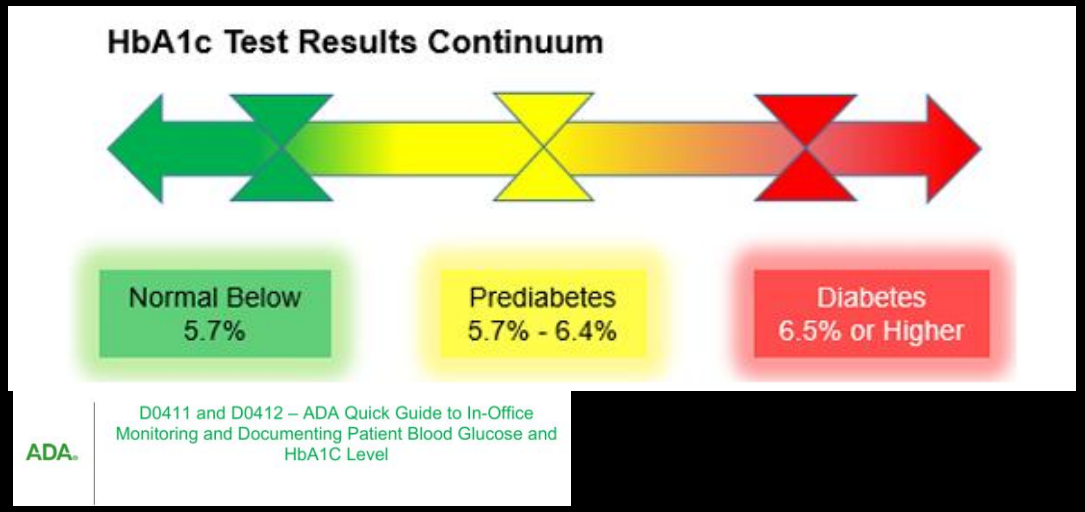
Comparison of Type 1 and 2 Diabetes

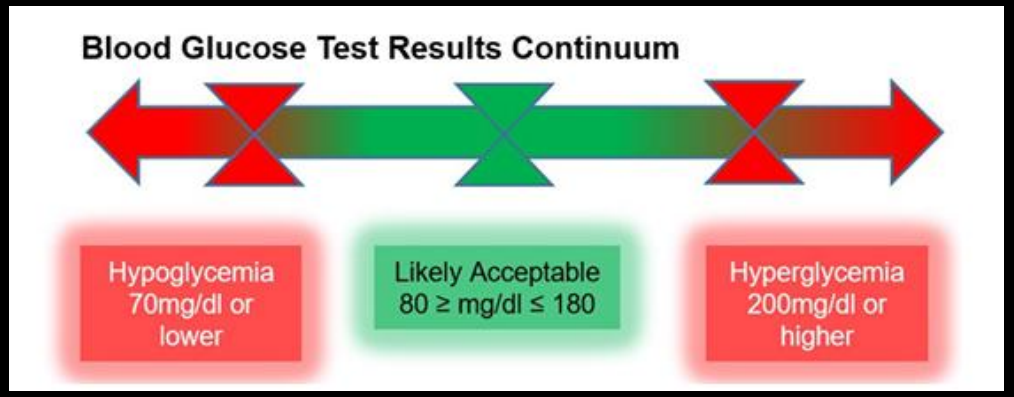
Feature	Type 1 diabetes	Type 2 diabetes
Onset	Sudden	Gradual
Age at onset	Mostly in children	Mostly in adults
Body size	Thin or normal[31]	Often obese
Ketoacidosis	Common	Rare
Autoantibodies	Usually present	Absent
Endogenous insulin	Low or absent	Normal, decreased or increased
Concordance in identical twins	50%	90%
Prevalence	~10%	~90%

Type 1 vs. Type 2 Diabetes



Hypoglycemia (Important numbers)





- Normal: 80-180 mg/dl, Hypoglycemia: < 70mg/dl
- ADA code D0411 & D0412 can be used for billing if you provide related services
- Patients should have their own glucometer to frequently check level of glucose

Hypoglycemia

- Type 1 Diabetic patients are most prone to hypoglycemia (low blood sugar)
- Earlier appointments are usually best to maintain normal diet/medication schedule
- Patients should have their own glucometer to frequently check level of glucose

Hypoglycemia

- Hypoglycemia usually occurs when the patient experiences a sudden decrease in caloric intake, infection, infection, or elevated metabolic rate due to severe anxiety
- If the patient does NOT adjust their usual insulin dosage to account for the decreased glucose availability, hypoglycemia can develop

Hypoglycemia

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- If the patient does NOT adjust their usual insulin dosage to account for the decreased glucose availability, hypoglycemia can develop

Signs/ Symptoms

- Insulin Shock can lead to lethargy, bizarre behavior, tremors, seizures, unconsciousness. Excess Insulin can lead to depleted glucose level
- Onset can be sudden, similar signs & symptoms for a CVA
- Assume unconscious diabetic patient is hypoglycemic

HYPOGLYCEMIA SIGNS/SYMPTOMS
Headache
Talkative
Sweating
Irritability
Impaired vision
Dizziness
Hunger

Diabetic Emergencies: Low Blood Sugar

Mild

Feelings of unease
Sweating
Trembling
Cold pale skin
Increased appetite

Moderate

Confusion
Rapid breathing
Changes in behavior
Seizures
Unconsciousness

Severe

Permanent brain damage
Death

Hyperglycemia vs Hypoglycemia

"Hot and Dry, Sugar high"

POLY means "more"

Polyphagia
more hunger

Polyuria
more urinating

Polydipsia
more thirsty

Dry Skin

Blurred Vision

Delayed Wound Healing

"COLD and CLAMMY needs some candy"

remember **TIRED**

T- Tachycardia

I- Irritability

R- Restless

E- Excessive Hunger

D- Dizziness

Pallor/ Clammy

Hyperglycemia Vs Hypoglycemia

Hypoglycemia: Management

Conscious Patient:

- TAP: Position upright (most comfortable)
- Oral carbohydrate:
  - need ~20 grams sugar: consider juice, soda, candy, glucose gel, frosting/icing
  - almost entire tube of glucose OR ~5 teaspoons of frosting
- BLS if needed– record vitals
- Consider taking blood glucose reading
- Observe 1 hour before dismissal

Hypoglycemia: Management

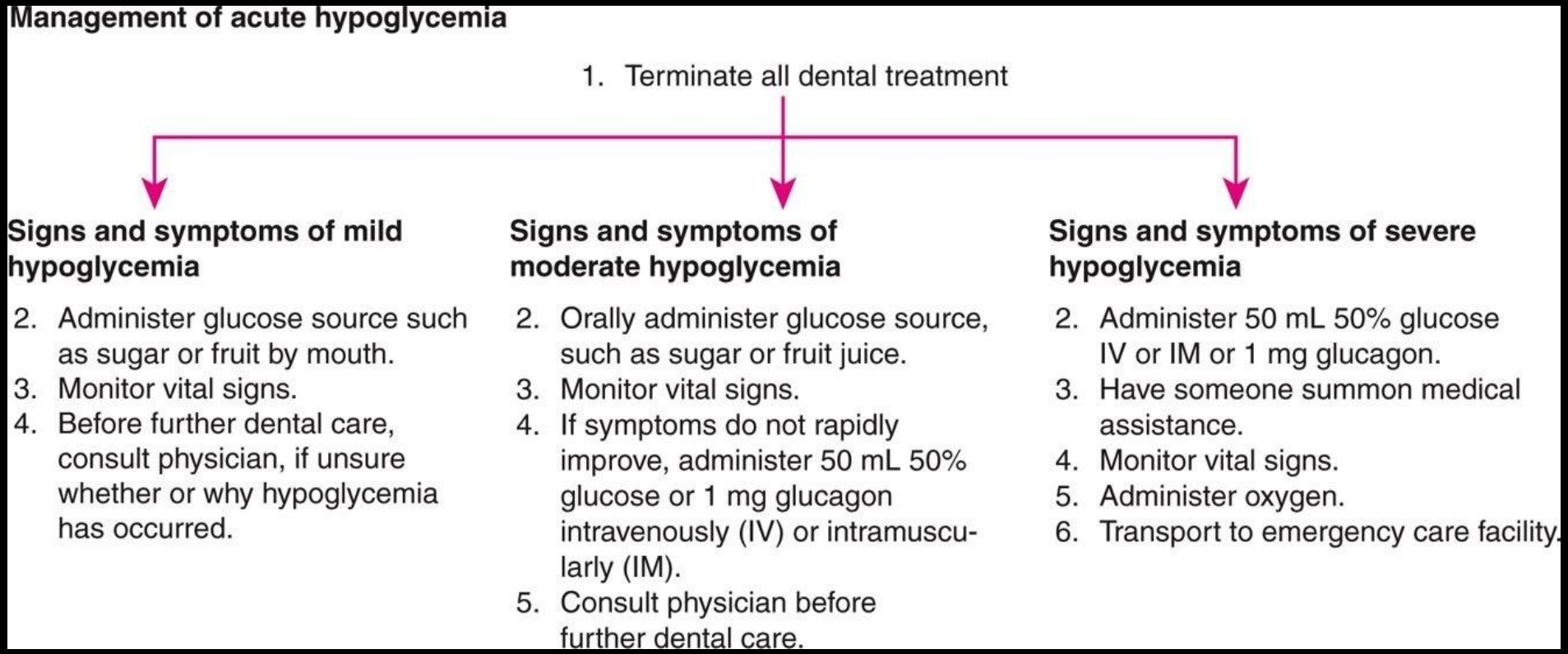
UNCONSCIOUS patient

- TAP: Position supine
- Call 911/Start BLS
- Oxygen: Consider ~6-10 liters/min
- Gel glucose: apply to upper muco-buccal fold/vestibule – watch that it doesn't go down throat/suction
- Consider taking blood glucose reading.
- IV 50% dextrose OR 1mg injectable glucagon (paramedics or ACLS-trained dentists)
- Airway suction q 5 minutes
- Discharge to paramedics

Hypoglycemia

- During the health history interview, the dentist should get a clear idea of the degree of control of the patient's diabetes
- If patients do not regularly check their own urine or serum glucose, their physician should be contacted to request a HbA1c
- If a diabetic patient indicates a feeling of low blood sugar or if signs or symptoms of hypoglycemia appear, stop the procedure & have pt consume a high-caloric carbohydrate

Hypoglycemia



- A patient who seems to have recovered from a hypoglycemic episode should remain in the office for at least 1 hour & further symptoms should be treated with oral glucose sources

Drug Summary

Recommended Emergency Drugs

INJECTABLE

Category	Generic Drug	Proprietary Drug	Alternative	Quantity	Availability
Allergy - anaphylaxis - ADULT > 30 kg (66 lbs)	Epinephrine	Adrenalin	None	2 preloaded autoinjector syringes	0.3 mg/syringe
Allergy - anaphylaxis - PEDIATRIC 15-30 kg (33-66 lbs)	Epinephrine	Adrenalin	None	2 preloaded autoinjector syringes	0.15 mg/syringe
Allergy - histamine-blocker	Diphenhydramine	Benadryl®	Chlorpheniramine	3 x 1 mL ampules	50 mg/mL

NON-INJECTABLE

Category	Generic Drug	Proprietary Drug	Alternative	Quantity	Availability
Oxygen	Oxygen	Oxygen		1 "E" Cylinder	
Vasodilator	Nitroglycerin	Nitrolingual Pumpspray®	NitroStat sublingual tablets	1 metered spray bottle	0.4 mg/metered dose
Bronchodilator	Albuterol	ProAir, Proventil, Ventolin	Metaproterenol	1 metered dose inhaler	Metered aerosol inhaler with "spacer"
Antihypoglycemic	"Sugar"	Orange juice, no "diet" soft drink	Insta-Glucose gel	1 bottle	
Inhibitor of platelet aggregation	Aspirin, powdered	Goody's®, BC Powder®	None		2 packets

Medical Emergency Plan

Medical Emergency Roles and Responsibilities (Four-Member Team)

The below roles will need to be assigned within your office staff. To ensure that each responsibility is covered, assign alternates for each team member. Print the cards on the next page and give them to the decided staff member for a quick reference during emergencies and drills. The roles should be reviewed and drilled quarterly. Update the assignments if there is a change in staff.

Team Member #1 (Leader)

- Takes command of situation and remains calm
- Check's the patient for response and for no/inadequate breathing
- Directs Team Members
- Checks for Pulse (no more than 10 seconds)
- Positions patient and performs C-A-B cardiopulmonary resuscitation (CPR)
- States instructions directly and clearly
- Requests acknowledgement from team members that instructions are understood
- Fosters open exchange among team members
- Concentrates on what is right for the patient, not who is right
- Stays with Patient

Team Member #2

- Brings automated external defibrillator (AED)
- Brings the oxygen tank with delivery devices including the bag-valve-mask (BVM)
- Brings the emergency medical kit
- Prepares and deploys the Automated External Defibrillator (AED)
- Sets up the oxygen tank and attaches the appropriate delivery device
- Assists with the CABs of CPR

Team Member #3

- Calls emergency medical services (911)
- Prepares drugs for administration
- Monitors patient's vital signs
- Checks oxygen tank and emergency kit regularly
- Assists with the CABs of CPR

Team Member #4

- Meets paramedics at building entrance
- Charts chronological log of events
- Assists with the CABs of CPR
- Assists with other tasks as needed

HealthFirst emergency preparedness

The "911" Call

When notified by the Team Leader, the responde will phone 911 and state the following.

1. State YOUR name, the name of The DOCTOR'S name, PRACTICE location and crossroads.

2. State the patients, SYMPTOMS, STATUS of the Patient, whether CONSCIOUS of UNCONSCIOUS, STABLE or UNSTABLE, ALERT, etc.

3. State the ENTRANCE into the practice. State whether the entrance is blocked, obstructed, etc.

4. State that someone will greet them.

5. Remember to stay on the phone until told to hang up!

6. Communicate to your team leader that EMS has been summoned and wait...

Courtesy of "Medical Emergency Mastery"
www.catharinegoodsondds.com
catharine@catharinegoodsondds.com

Post Medical Emergency

- Make sure the medical emergency treatment record contains all pertinent information
- Review the treatment record and all actions taken with the team
- Ask to have cart/drug box/O_2 restocked as needed

HealthFirst emergency preparedness

Medical Emergency Preparedness Checklist

Staff Preparation and Training

	Have all staff members been assigned specific roles and duties?
	Have all staff members received appropriate training in the management of medical emergencies?
	Have all clinical staff members received training in American Heart Association Basic Life Support for Health Care Providers (AHA BLS HCP)?
	Is the doctor or person responsible for the Emergency Medical Kit familiar with its contents?
	Has the doctor or person responsible for the Emergency Medical Kit received training on the medications contained in the kit?
	Has the unannounced emergency medical drill been conducted this quarter?

Office/Facility Preparation

	Have all staff members been assigned specific roles and duties?
	Have all staff members received appropriate training in the management of medical emergencies?
	Have all clinical staff members received training in American Heart Association Basic Life Support for Health Care Providers (AHA BLS HCP)?
	Is the doctor or person responsible for the Emergency Medical Kit familiar with its contents?

Emergency Medical Equipment, Supplies & Medications

Is your office equipped with emergency equipment and supplies that are appropriate for your practice?

	Basic Emergency Oxygen System • Portable Oxygen E-Cylinder • Variable Regulator • Bag-Valve Mask for delivering positive pressure • Supplemental O2 Masks (adult and child) • Nasal Cannula
	Emergency Medical Kit • Epinephrine Auto-Injectors (adult and pedo) • Epinephrine 1mg/ml back up ampules • Diphenhydramine 50mg/ml vials • Asthma Inhaler • Nitroglycerin tabs or spray • Aspirin • Ammonia Inhalants • Glucose • Syringes • CPR pocket Mask
	Miscellaneous Equipment • Automated External Defibrillator (AED) • Stethoscope • Sphygmomanometer with adult cuff sizes (small, medium and large) • Watch or wall clock with second hand(s) • Magill forceps

Treatment Record

Western University Dental Center

Medical Emergency Treatment Record

Patient Name: _____ Date: _____ Time emergency began: _____

Allergies: _____

Time	Blood Pressure	Pulse	Resp	Oxygen Saturation %	Oxygen Flow L/min	Medications Administratered	Medication Dosage	Medication Route (IV, IM, PO,SL)

Time if 911 EMS called: _____

Time of EMS arrival: _____

1st Responder: _____

2nd Responder: _____

3rd Responder: _____

Condition of patient when leaving Clinic (ambulatory/EMS): _____

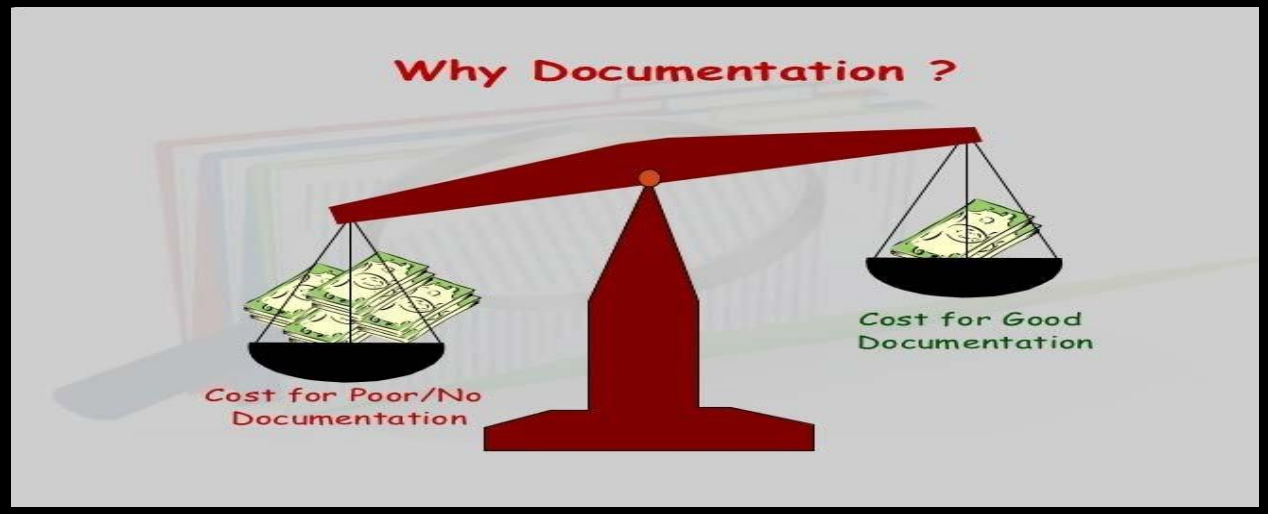
_____

Person taken to what hospital: _____

Signature of Emergency Team Leader: _____

8/26/10

Summary



- Medical Emergencies can occur at any time, and it is the responsibility of the provider to be able to adequately manage these situations
- Staying calm during these situations is imperative
- Staff should know their roles in the event of an emergency
- Document, document, document!!!

Feel free to email me at hdsingh1891@gmail.com