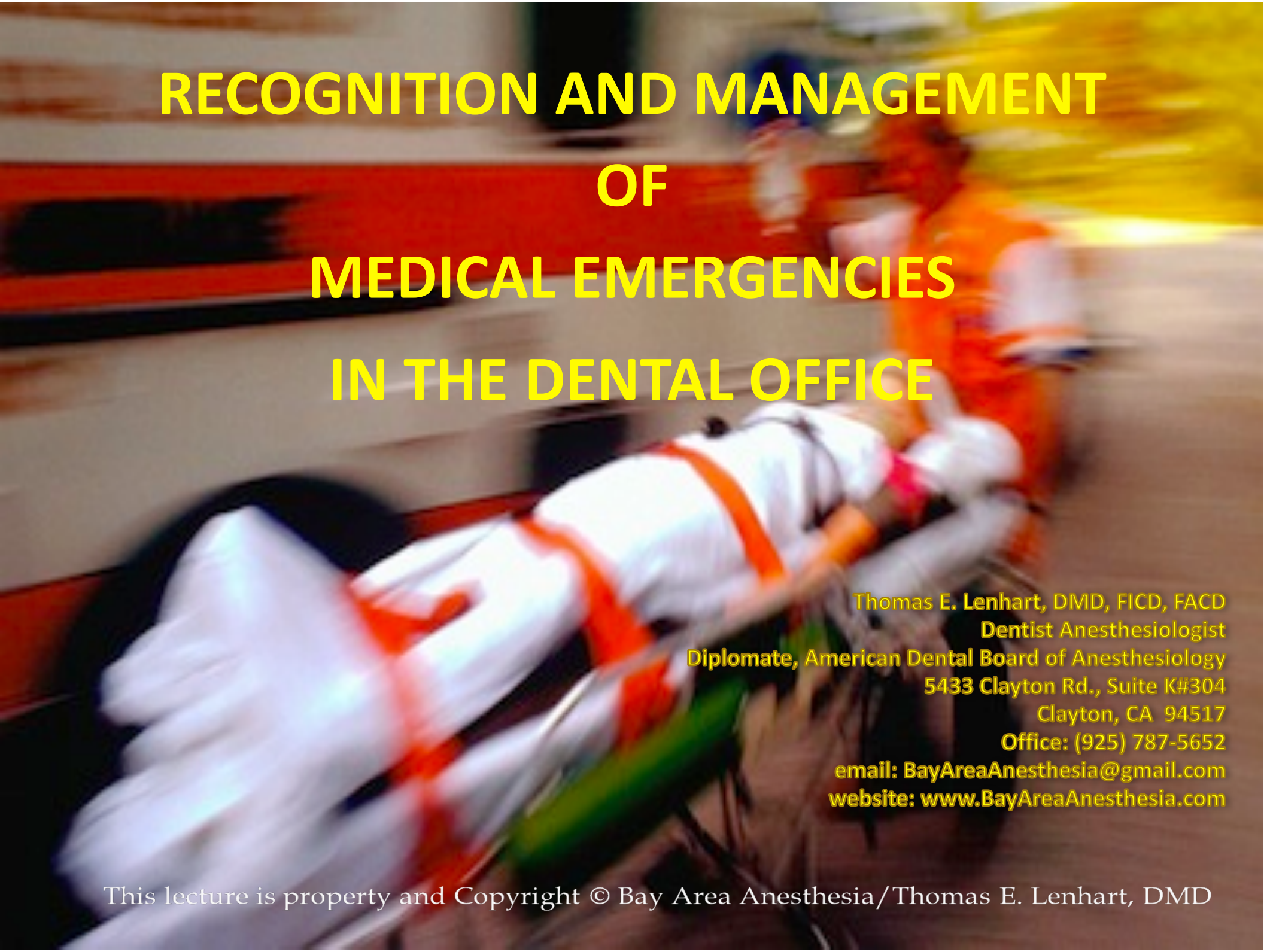
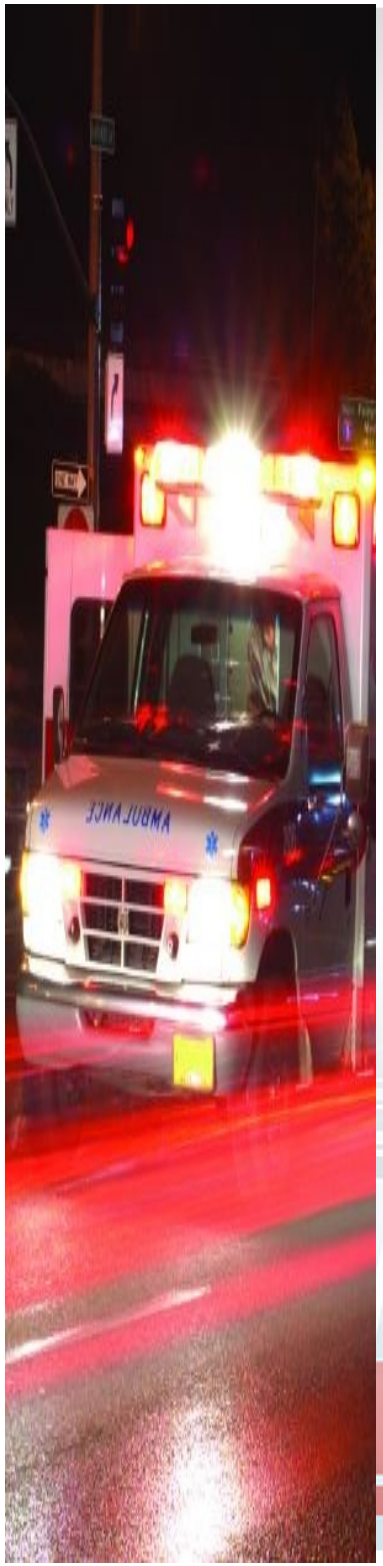


RECOGNITION AND MANAGEMENT OF MEDICAL EMERGENCIES IN THE DENTAL OFFICE

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A Medical Emergency will happen in your Dental Office

Statistics show that **Medical emergencies** occur in dental offices **every 2 to 4 years on average**.

It is **Estimated** that the A**verage Dental Office** will have to deal with at least one or two **Life-Threatening Medical Emergencies** in their office during their career.

If quickly recognized and effectively managed most emergencies are resolved in the office without hospitalization.

Whether a Medical Emergency occurs today, tomorrow or years in the future, The Outcome depends on Prevention, Preparation, and Practice.





MEDICAL EMERGENCIES

Most Common Medical Emergencies

- Syncope
- Hypoglycemia
- Airway Obstruction
- Bronchospasm/Asthma
- Allergic Reaction/Anaphylaxis
- Seizure
- Angina
- Myocardial Infarction



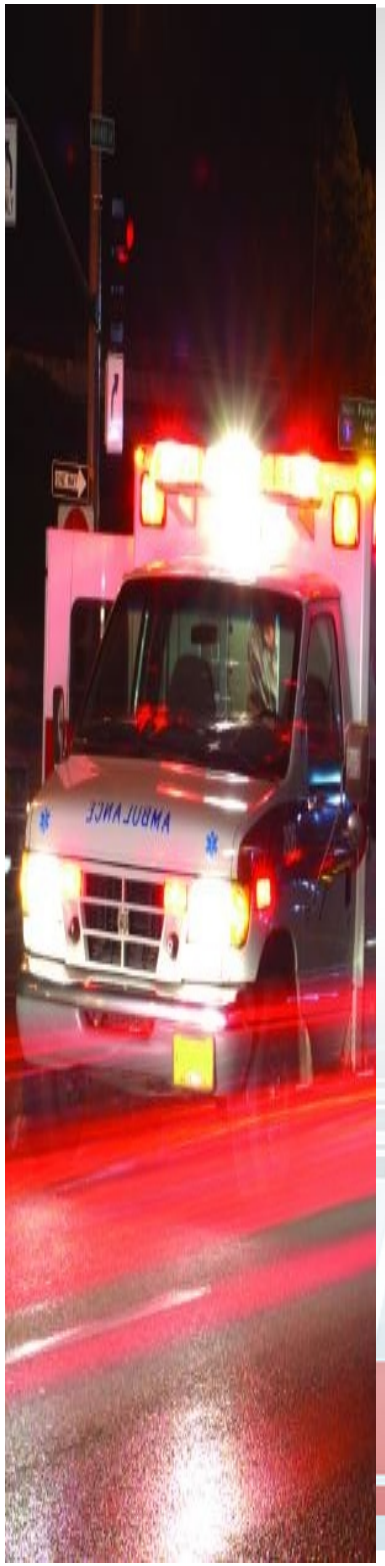


MEDICAL EMERGENCIES

Emergency Triggers

- Stress & Anxiety
- Medications/Local Anesthesia
- Aspiration/Foreign Body
- Positioning
- Fasting/Diabetes





MEDICAL EMERGENCIES

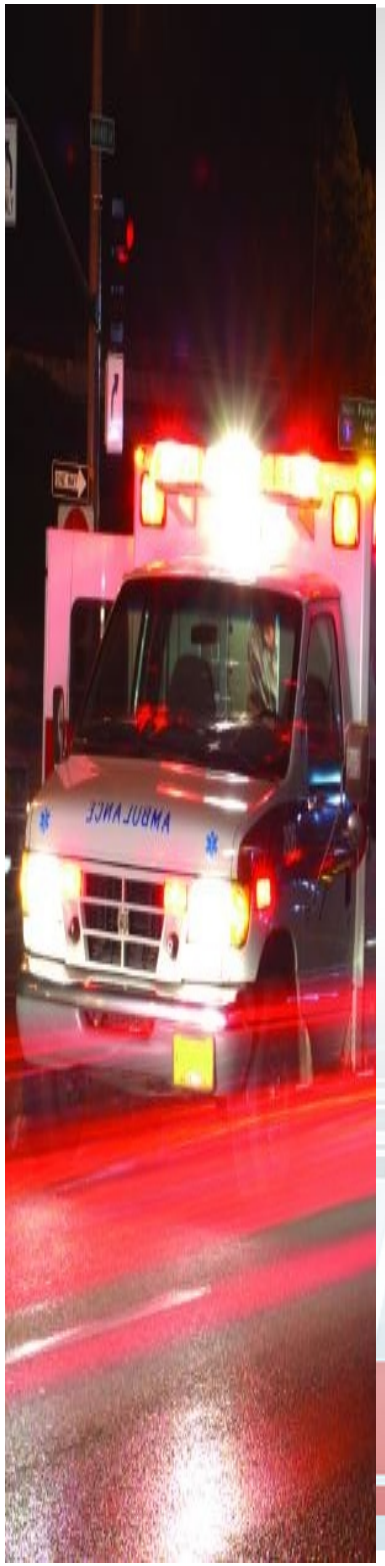
Common causes

- **Syncope (Fainting)**

  - Stress or Anxiety related to dental procedures can lead to vasovagal syncope, causing a sudden drop in blood pressure and loss of consciousness.

- **Allergic Reactions (Anaphylaxis)**

  - Patients may experience allergic reactions to medications, local anesthetics, latex, or other materials used in dental procedures, leading to symptoms ranging from mild itching to severe anaphylaxis.



MEDICAL EMERGENCIES

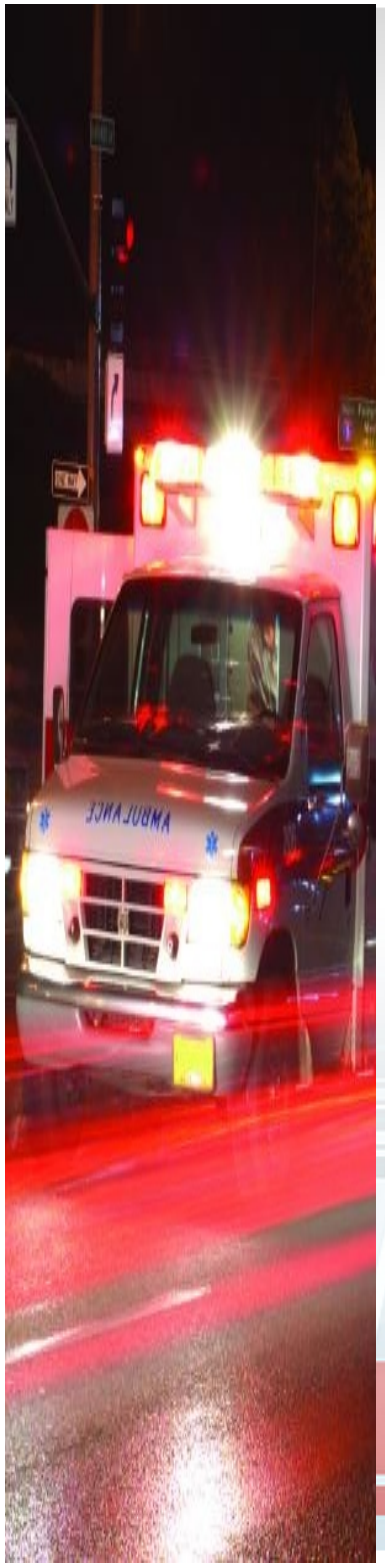
Common causes

- **Respiratory Distress**

  - Airway obstruction, bronchospasm, or aspiration of foreign objects during dental procedures can lead to difficulty breathing, respiratory distress and respiratory arrest.

- **Angina or Myocardial Infarction**

  - Patients with underlying cardiovascular diseases may experience angina (chest pain) or even a heart attack (myocardial infarction) due to stress or the physiologic and/or pharmacologic effects of dental treatment.



MEDICAL EMERGENCIES

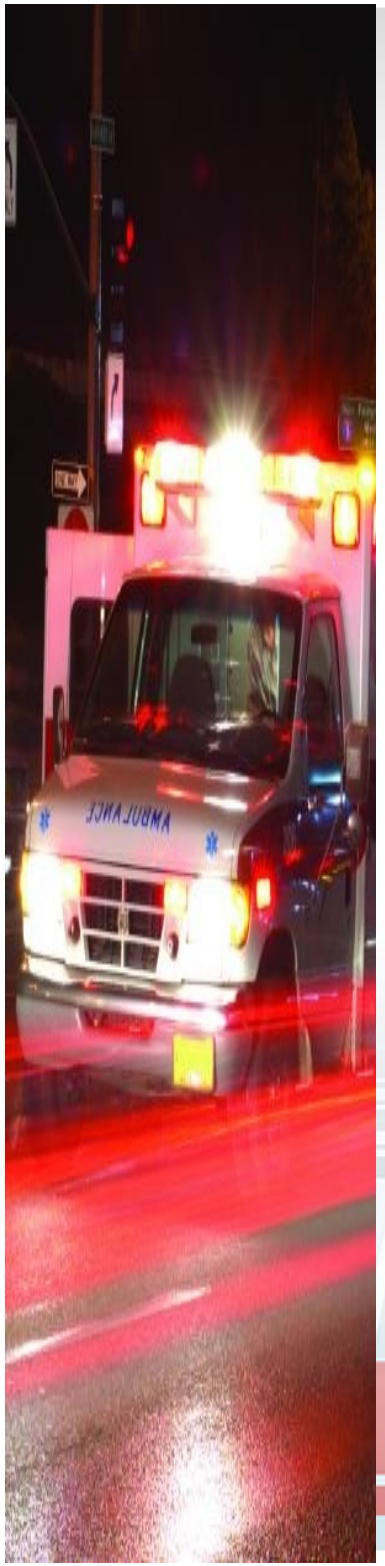
Common causes

- **Hypoglycemia**

  - Diabetic patients may experience low blood sugar levels (hypoglycemia) during dental procedures, especially if they have not eaten or taken their medications as prescribed.

- **Seizures**

  - Patients with a history of epilepsy or other seizure disorders may experience seizures triggered by stress and anxiety of certain dental procedures.



MEDICAL EMERGENCIES

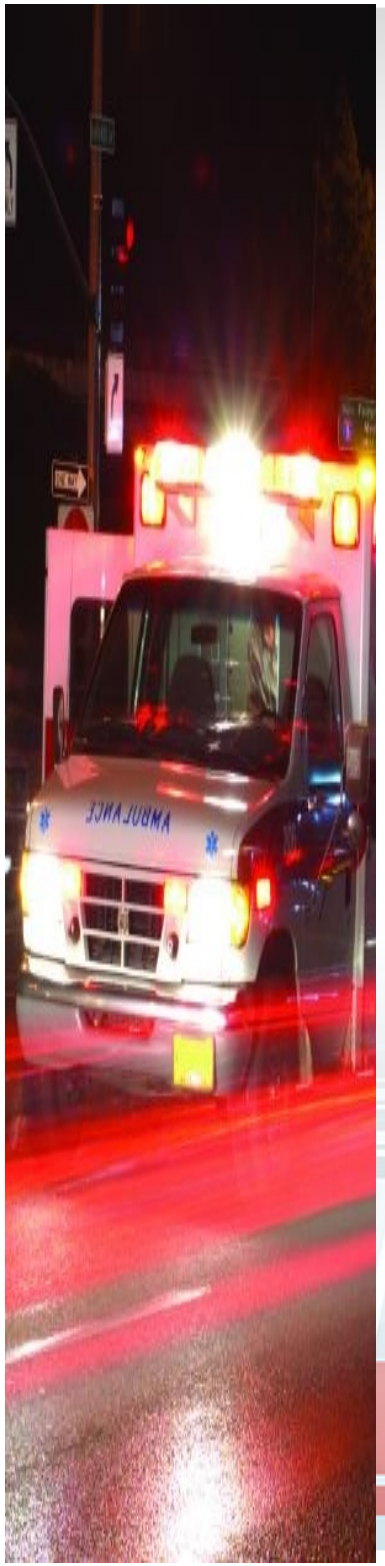
Common causes

- **Postural Hypotension**

  - Changes in position, such as sitting up or standing suddenly, can lead to a sudden drop in blood pressure, resulting in dizziness or fainting.

- **Drug-related Reactions**

  - Adverse reactions to medications administered during dental procedures, such as local anesthetics or sedatives, can occur in some patients.



MEDICAL EMERGENCIES

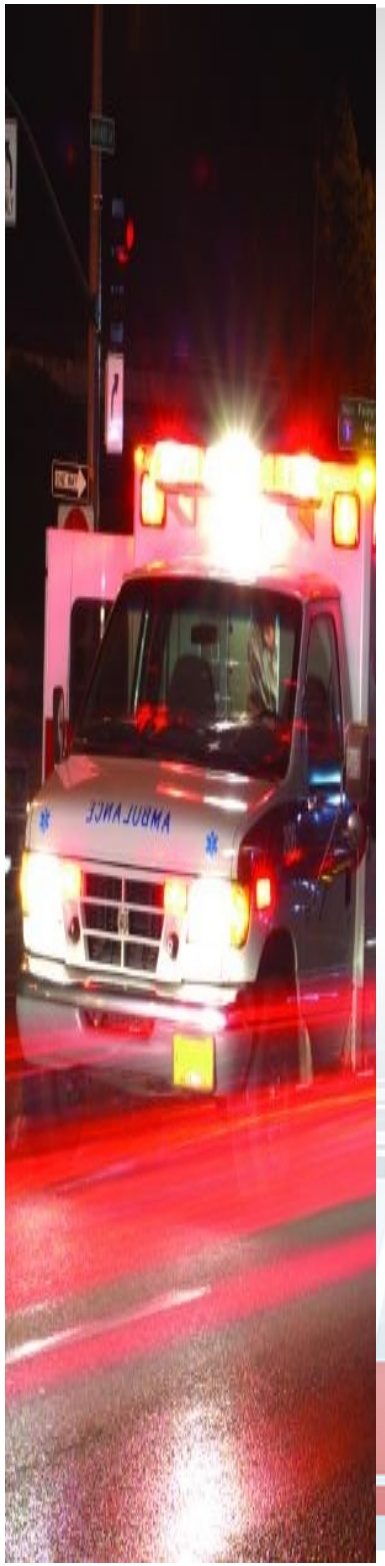
Common causes

- **Choking**

  - Accidental ingestion or inhalation of foreign objects or dental materials can lead to airway obstruction and choking.

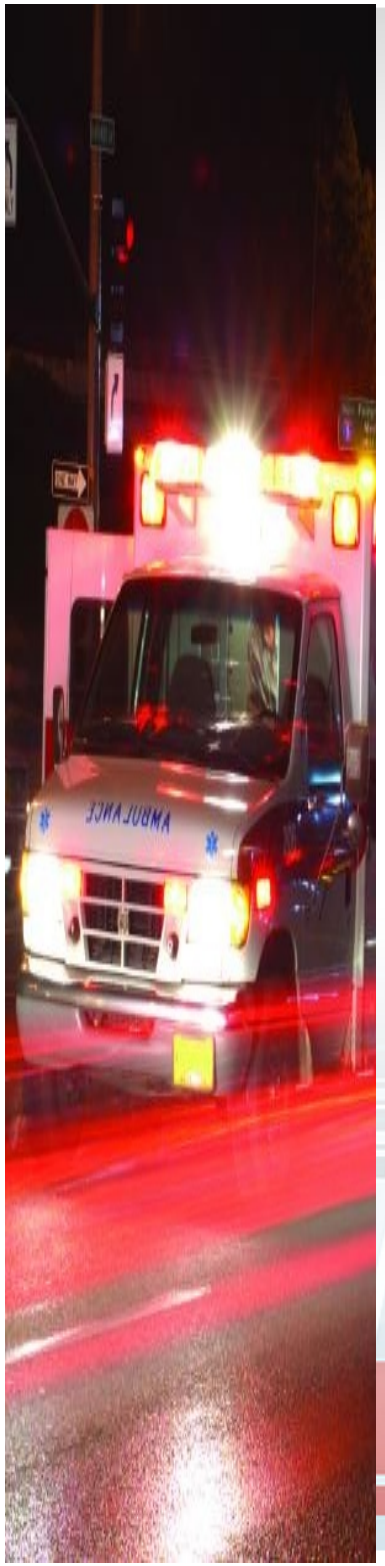
- **Stroke**

  - Patients with underlying cardiovascular conditions may be at risk of experiencing a stroke due to factors such as hypertension, atherosclerosis, or clotting disorders.



How Prepared are YOU and your Office for Medical Emergencies?

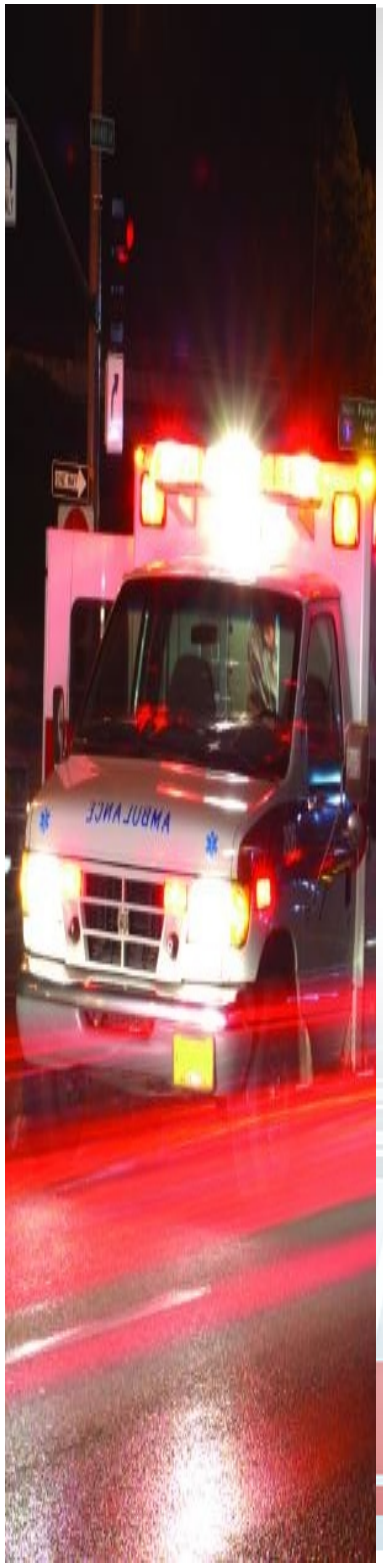




Famous Last Words

"In all the years I have practiced, I have never had a medical emergency and if it does happen, I will just call "911".

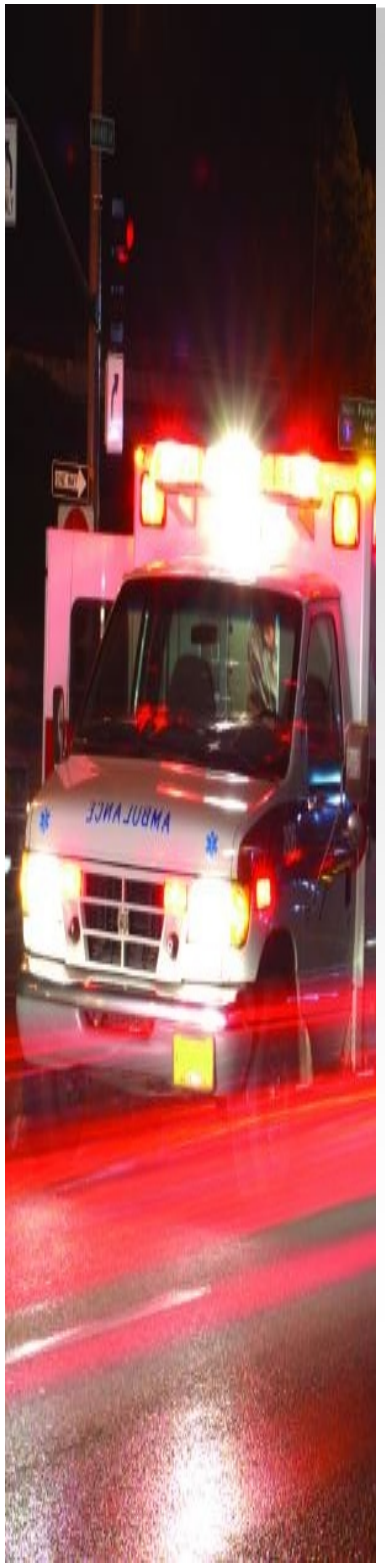




This is Natalie



AMBULANCE



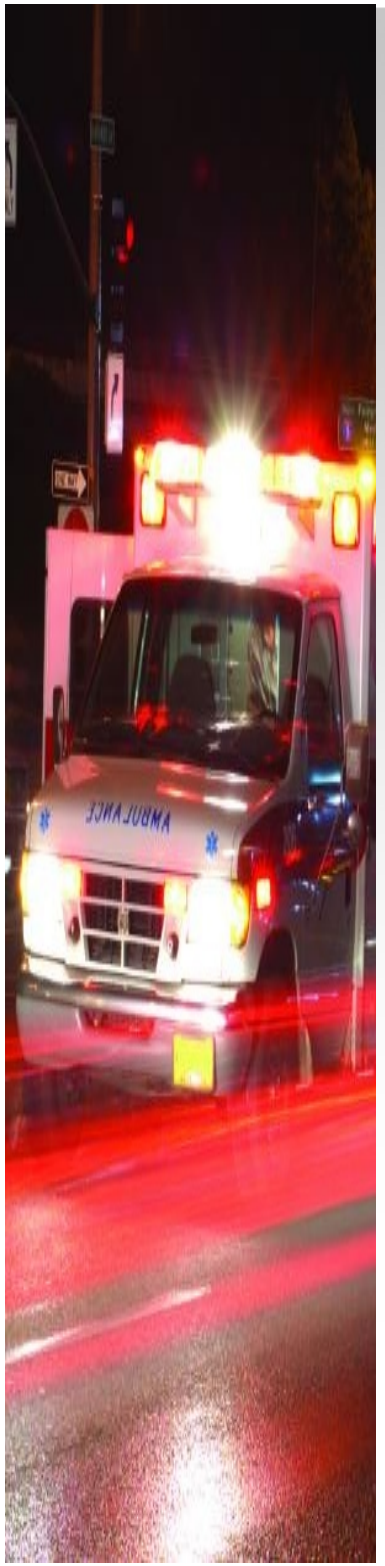
Medical Emergencies



CASE: Natalie G.

Natalie is the “Star-forward” on her high school soccer team. She is a 15 year old teenager when she presents to her general dentist’s office for routine dental treatment.

Her medical history was negative. No Medications. No Allergies. No Social History (- Tob, - Etoh, - Drugs). Past Surgical History of tonsillectomy w/o complications.

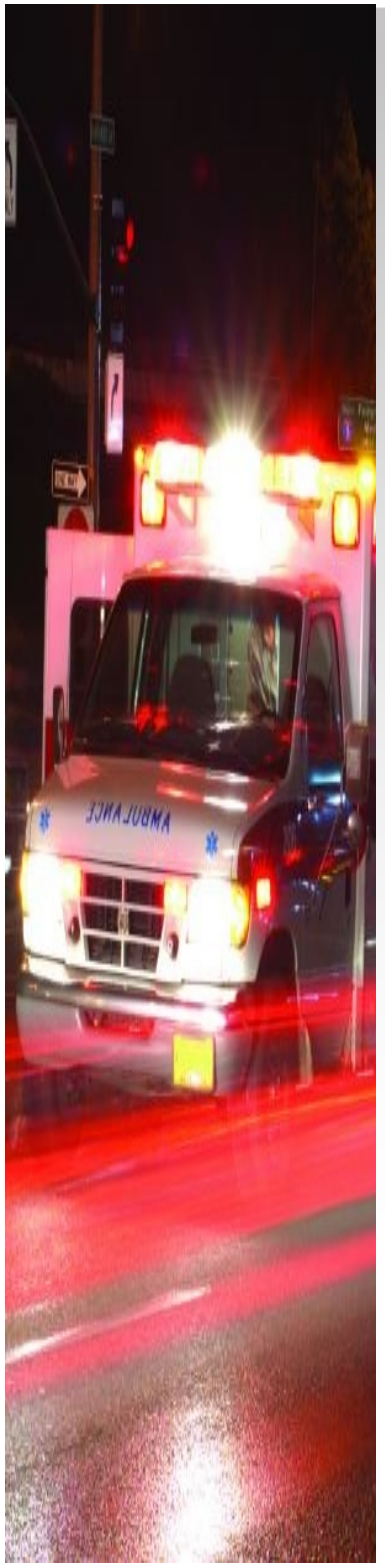


Medical Emergencies



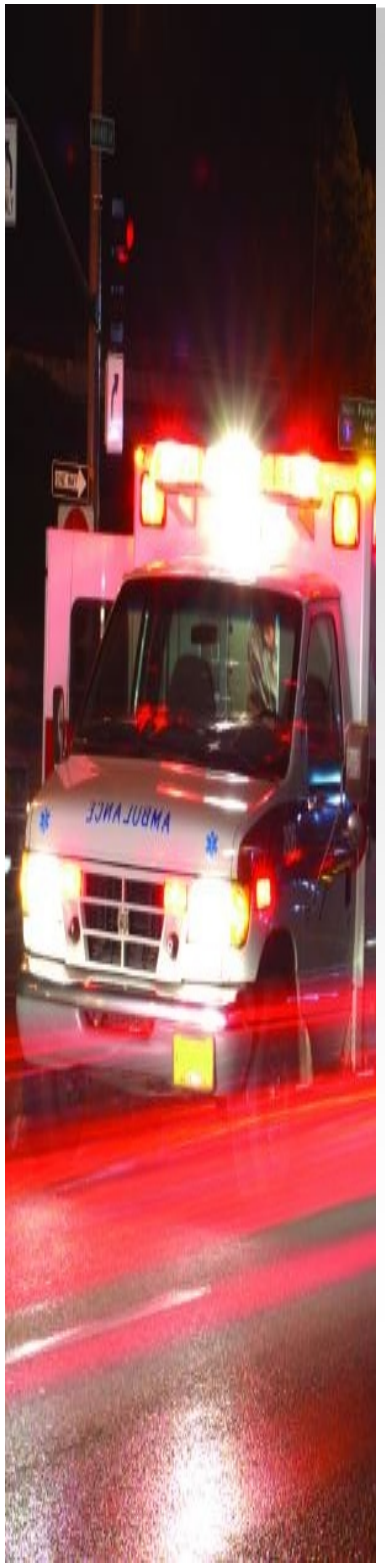
CASE: Natalie G.

During her routine dental appointment, immediately after her local anesthesia was given, Ms. Natalie complained of not feeling well, dizziness and being nauseous. She then slumped in the dental chair and became unresponsive…….



Medical Emergencies

What happened next changed Natalie's Life "FOREVER"……



Medical Emergencies

In-effective Recognition & Management

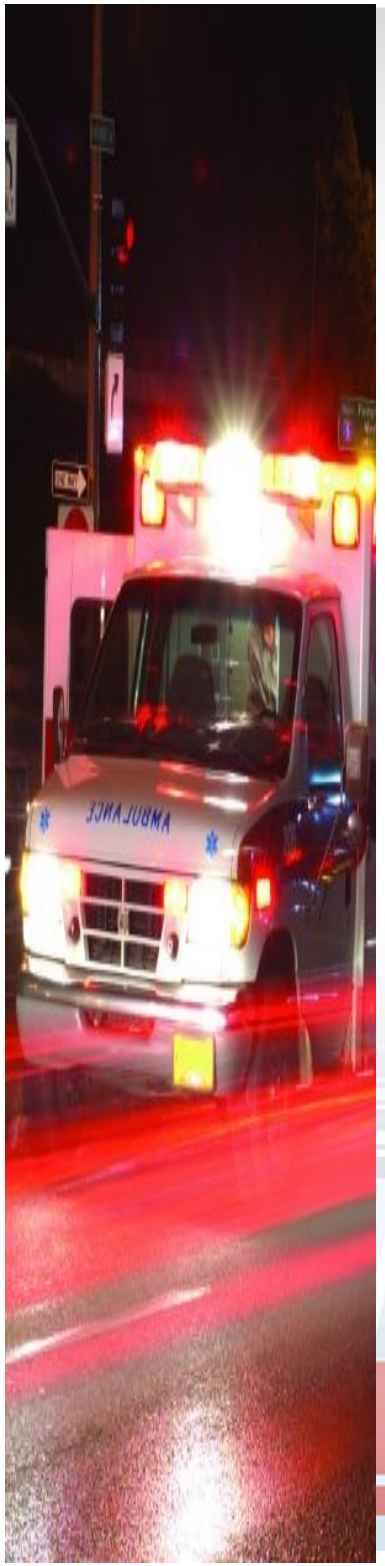
OUTCOME :

- Natalie suffered Irreversible Hypoxia Brain Damage.
- **Her Outcome** was completely **PREVENTABLE**

"……I will just call 911"

This is Natalies **LIFE** today.

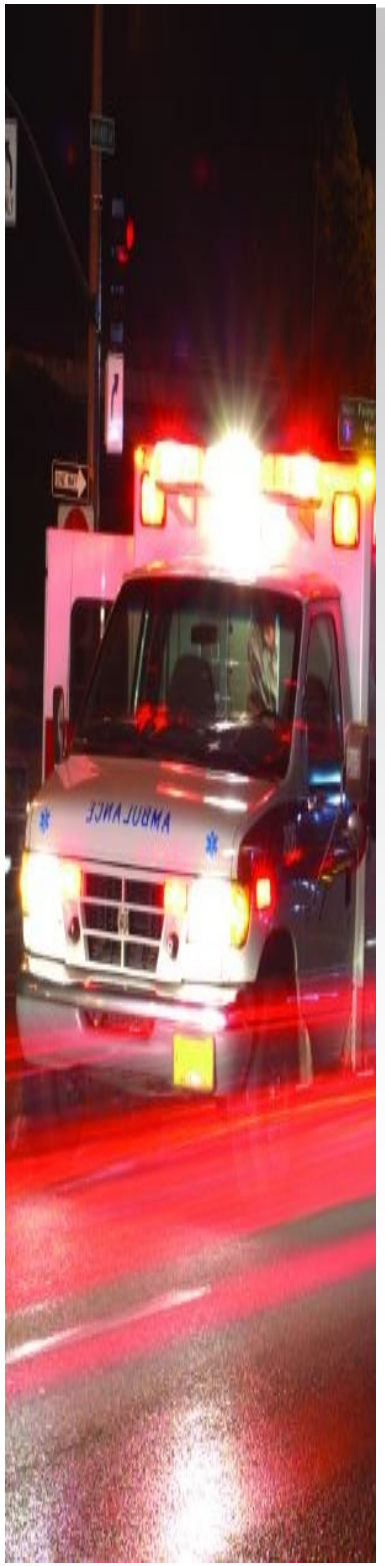




How Prepared are YOU and your Office?

By prioritizing Preparation, Training and Communication, your dental office can enhance their readiness to effectively Recognize and Manage medical emergencies in the 0ffice thus ensuring the safety and well-being of their patients.

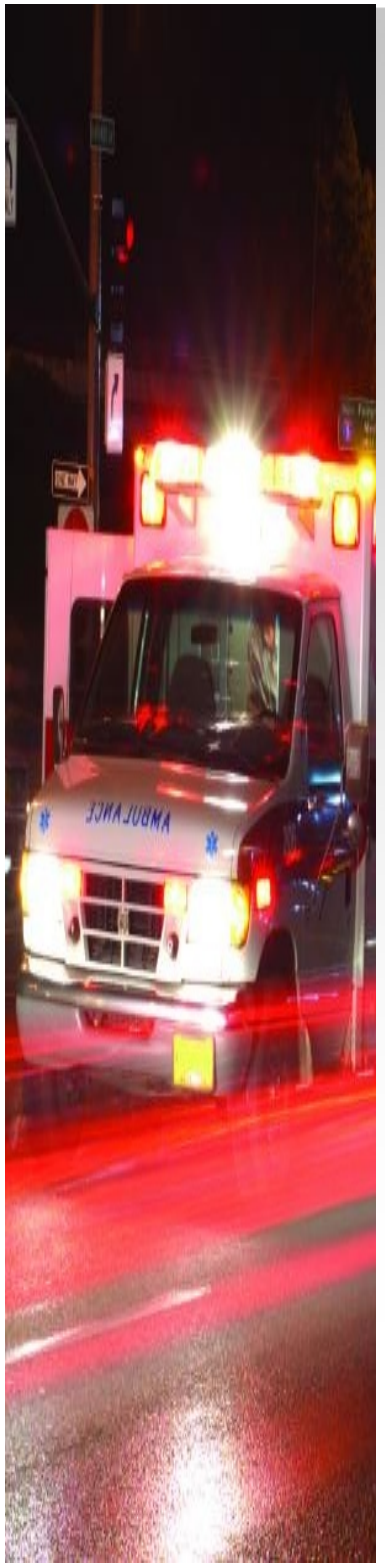




MEDICAL EMERGENCIES

How Do You Save a Life

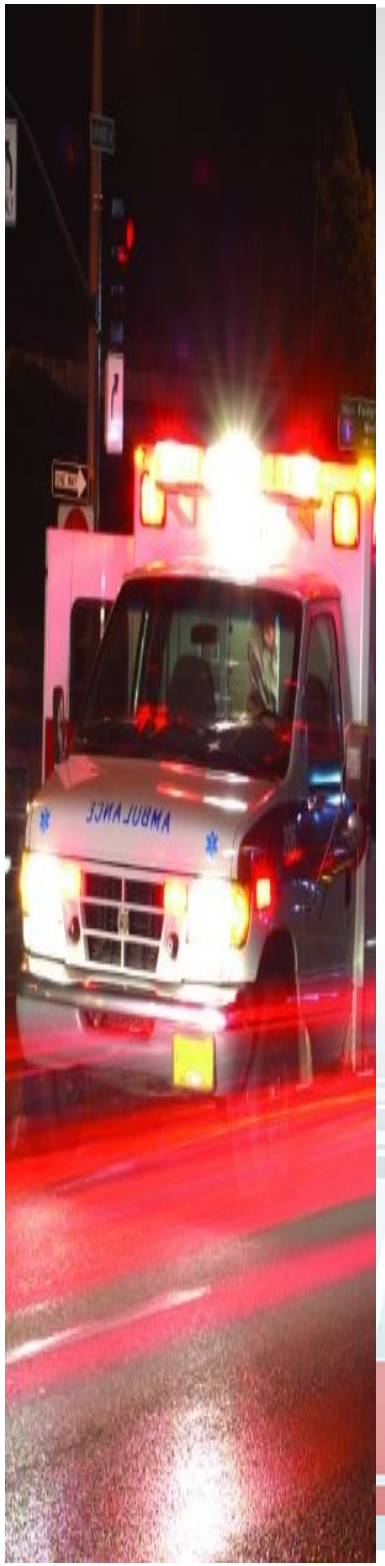
- Prevention
- Preparedness
- Recognition
- Response
- Team



MEDICAL EMERGENCIES

Prevention

- Medical History
- Review of Systems
- Risk Assessment
- Vitals

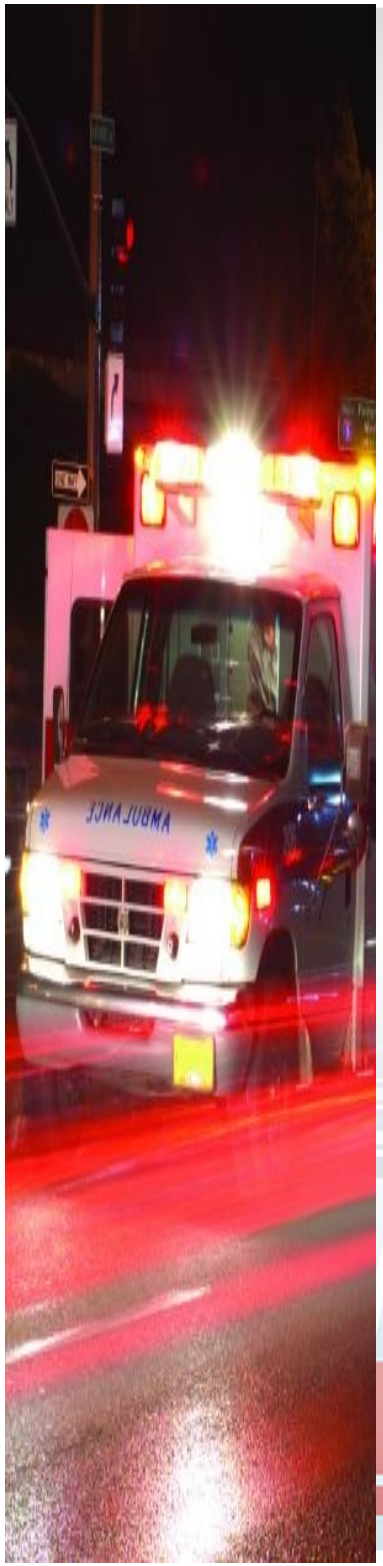


MEDICAL EMERGENCIES

The **Purpose of a Medical History** is to screen for medical risk factors such as;

- Abnormalities of major organ systems (heart, lungs, liver, kidneys, immune system, bleeding disorders).
- Allergies to Medications.
- Previous Adverse Reactions.
- Medications & Drug interactions.
- Drug, Alcohol and/or Recreation Drug Abuse.



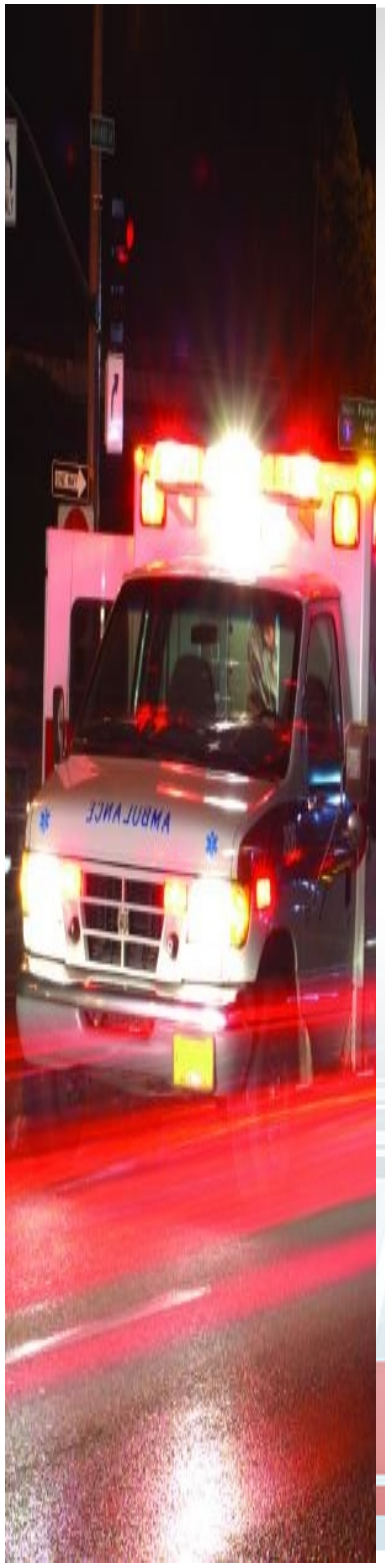


MEDICAL EMERGENCIES

Review of Systems

"Review Of Systems (ROS)" is a verbal inquiry of a list of questions, arranged by organ systems, designed to uncover dysfunction and disease.

- Heart
- Lungs
- GI Tract
- Musculoskeletal System
- Central Nervous System
- Hematologic - Bleeding Disorders



MEDICAL EMERGENCIES

ASA Risk Assessment

The American Society of Anesthesiologists (ASA) Physical Status Classification System is a standardized, 6-level scale (I-VI) used to assess a patient's pre-treatment health and co-morbidities, helping to predict perioperative risks, such as morbidity and mortality.

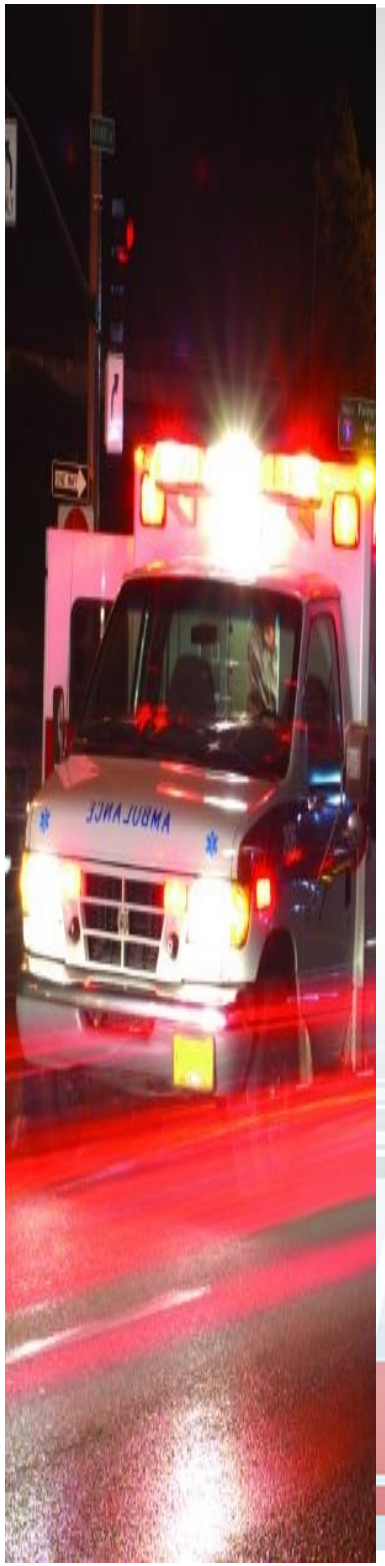
- Guides clinical decision-making
- Improves communication among Dental Staff
- Documents a patient's baseline status



ASA Risk Classification

ASA Classification	Description	Examples	Stability
1	A normal healthy patient with good exercise	Unremarkable medical history	Excellent
2	A patient with mild systemic disease with no functional limitations	Controlled: Asthma, Diabetes, Seizures, HTN, anemia	Generally Good
3	A patient with severe systemic disease and clearly defined functional limitations	Poorly controlled: Asthma, Diabetes, Seizures. Morbid Obesity	Intermediate to poor
4	A patient with severe systemic disease that is a constant threat to life	Advanced degrees of pulmonary, cardiac, hepatic, renal and/or endocrine insufficiency	Poor

Source: New England Journal of Medicine 2000; 342:913

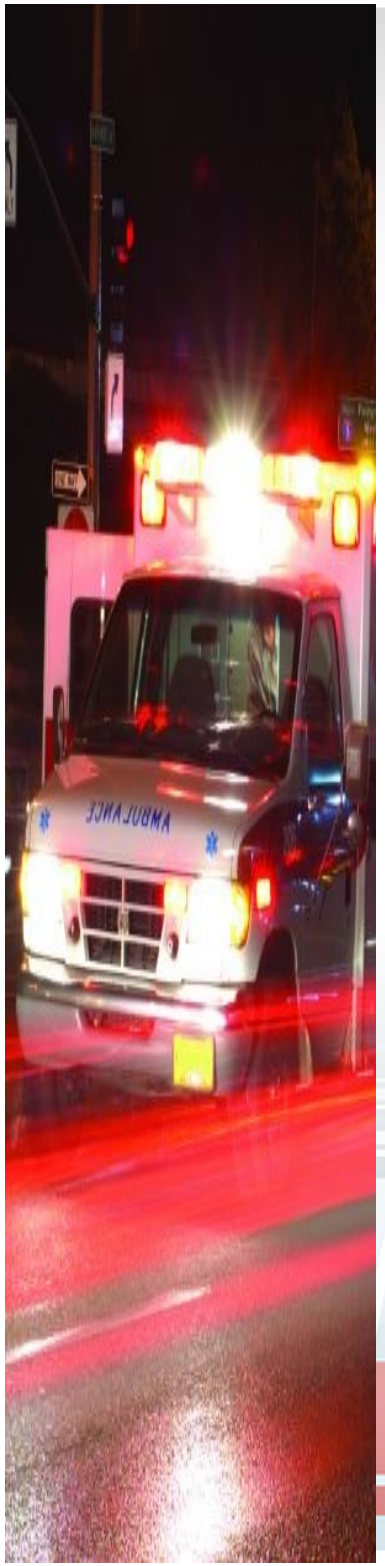


MEDICAL EMERGENCIES

Vitals That Matter

Obtaining Vital signs provides a baseline measurement from which alterations in treatment can be tailored to the patients condition and determine the severity of the medical emergency.

- Blood Pressure
- Heart Rate
- Respiratory Rate
- Oxygen Saturation
- Temperature



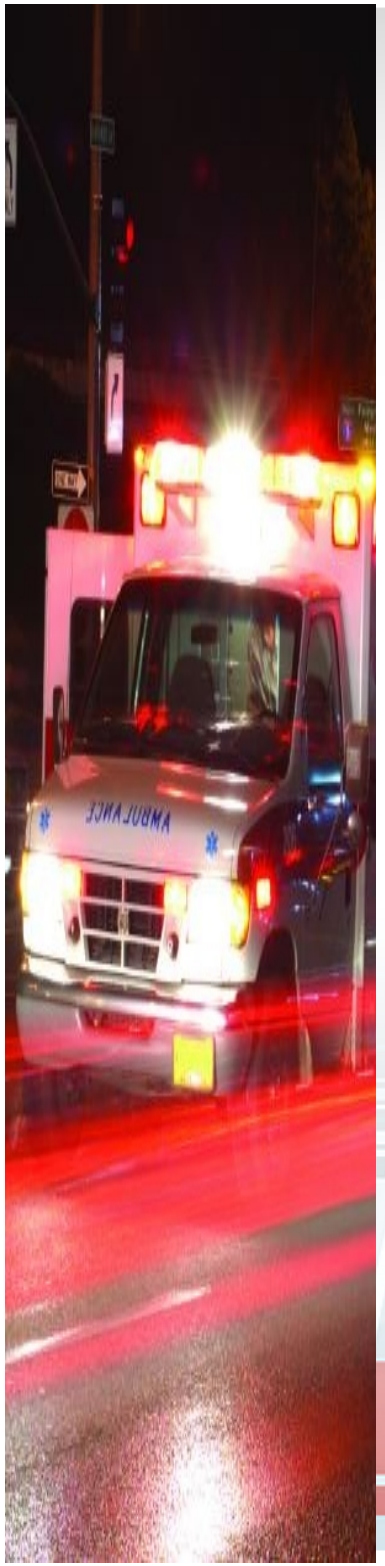
MEDICAL EMERGENCIES

Vitals That Matter

In an Emergency, understanding Vitals tell you;

- Where you are.
- Guide you what to do next.
- Reveal how severe your emergency is.



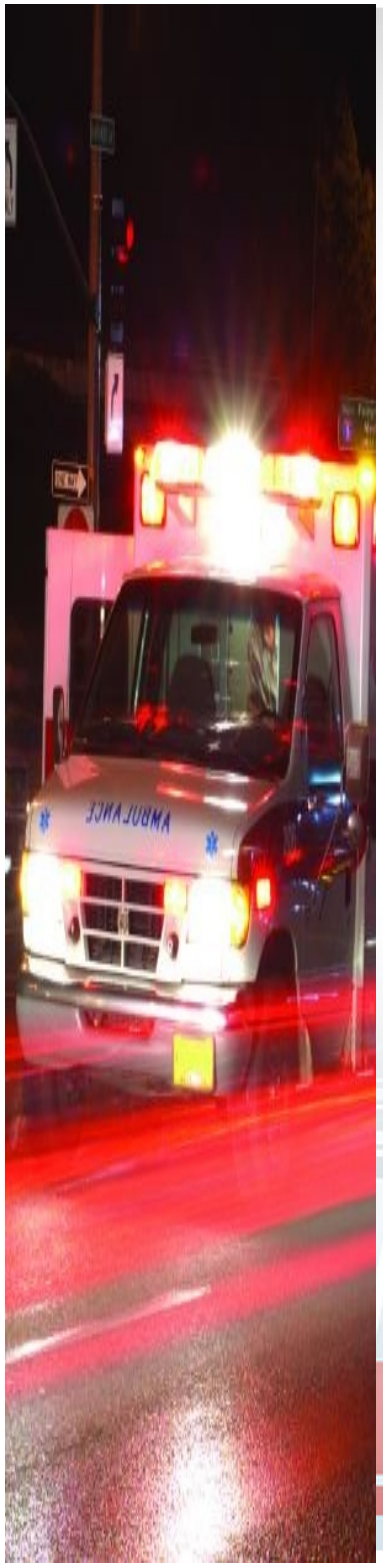


Baseline Vitals - Blood Pressure

- Blood Pressure is all about ***perfusion.***
- Getting oxygenated blood to the end organs and the tips of your fingers & toes

Figure 8. Blood Pressure Classifications	
Normal	120/80 or lower
Pre-hypertension	Between 120-139 systolic and/or 80-89 diastolic
Hypertension	Anything over 140 systolic and/or 90 diastolic





Baseline Vitals - Heart Rate

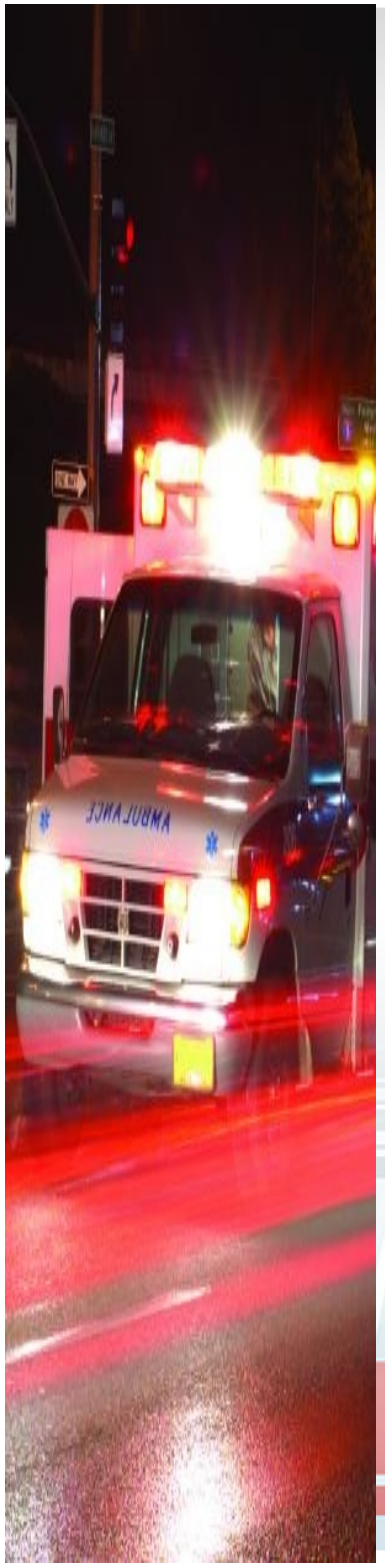
The pulse is a pressure wave that can be felt as the heart contracts and propels a volume of blood forward in the arterial system.

Three assessments can be made concerning the pulse; rate, strength, and regularity. The number of pulsations in fifteen seconds is counted and then multiplied by four to obtain the pulse rate.

Figure 6. Location of Pulse Points

Artery (Pulse Point)	Location
Carotid artery	Neck
Brachial artery	Medial aspect of antecubital fossa
Radial artery	Thumb side of anterior wrist
Ulnar artery	Little finger side of anterior wrist
Femoral artery	Medial aspect of thigh in groin area
Dorsalis pedis artery	Top of foot
Posterior tibial artery	Behind inside of ankle bone

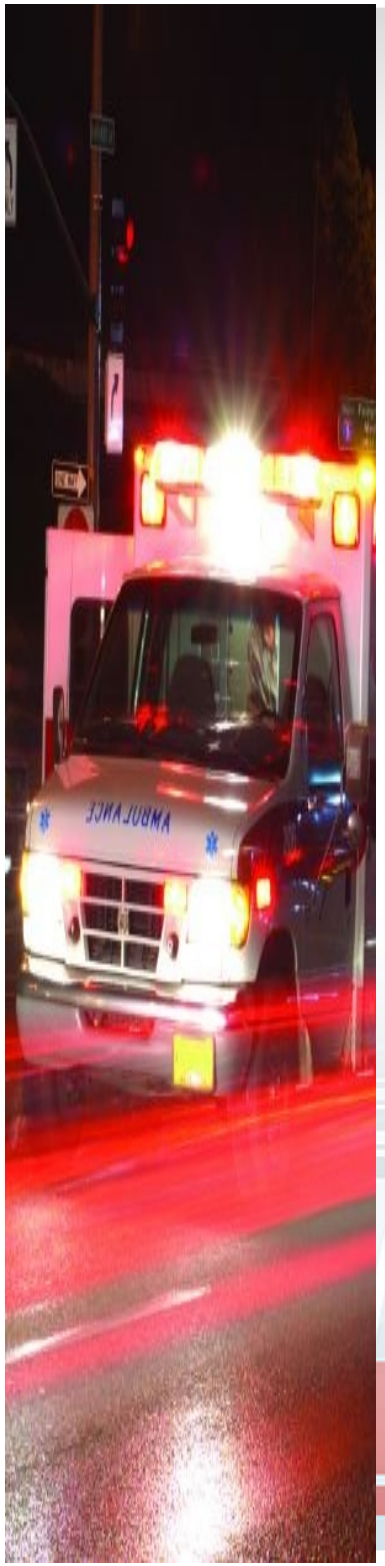




Baseline Vitals - Heart Rate

Normal Pulse Rates	
Age or Fitness Level	**Beats per Minute**
Babies to age 1	100-160
Children ages 1 – 10	60-140
Children ages 10+ and adults	60-100
Well-conditioned atheletes	40-60





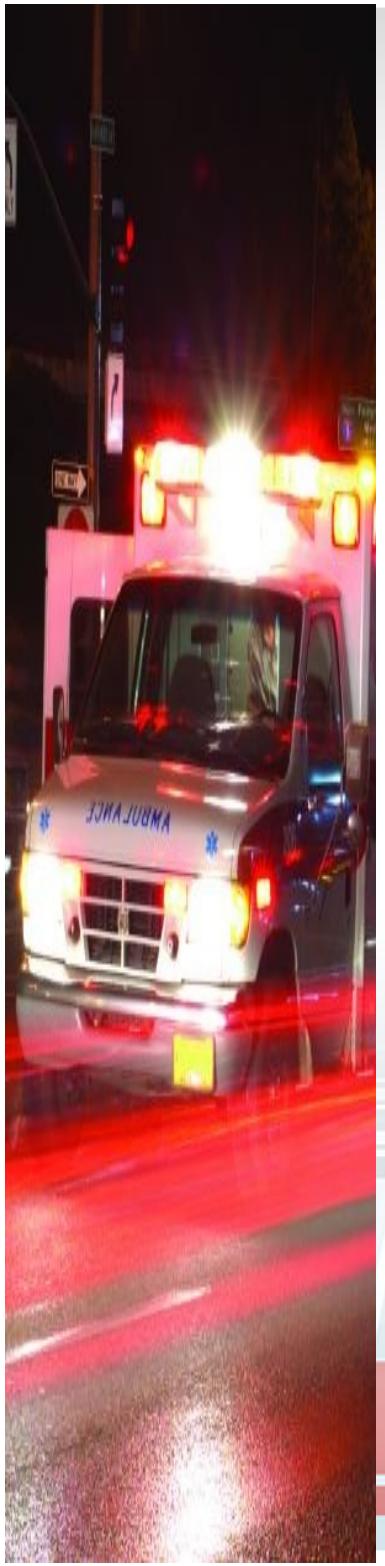
Baseline Vitals - Respiratory Rate

The respiratory rate is determined by the number of breaths in fifteen seconds then times by four. One breath or respiratory cycle consists of one inhalation and one exhalation.

- Factors that can increase the respiratory rate include anxiety, fever, and hypoxia.
- Respiratory rates can increase with age due to decreasing lung elasticity.
- The respiratory rate will decrease with the use of narcotics and benzodiazepines
- The rate, depth, and regularity of respirations are indicators of emergencies.

Normal Respiratory Rates	
Age Group	**Respiratory Rate**
Adults	12-20
Teenagers	15-25
Toddlers	20-30
Infants	25-40



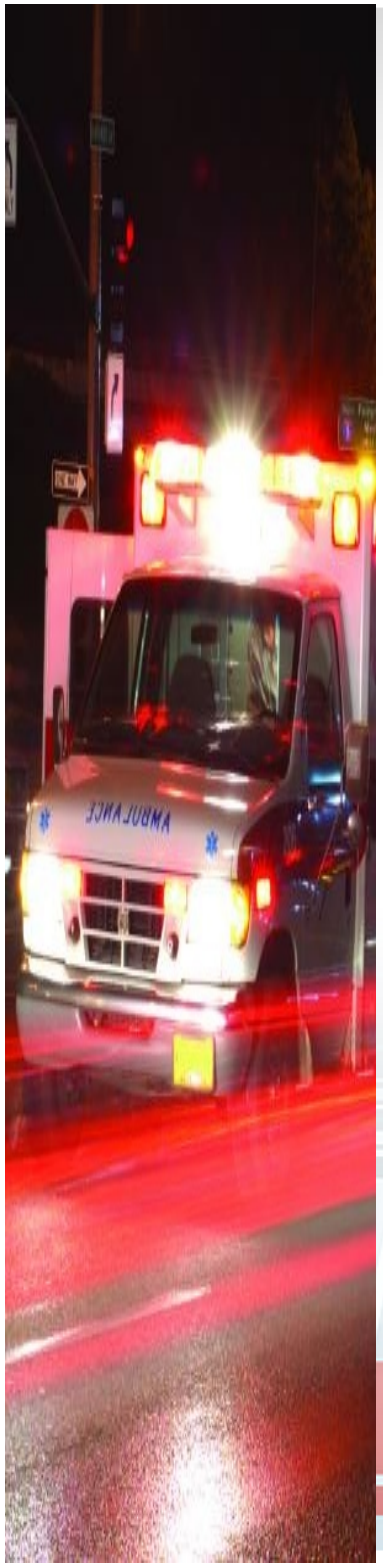


Baseline Vitals - Temperature

- Temperature will often indicate if the patient has an infection.
- An oral temperature in excess of 99.6° F (37.5° C) is an indicator of the presence of a viral or bacterial infection.

Body Temperature by Location	
Location	**Normal Reading**
Oral	98.6°F
Tympanic (ear)	98.6°F (oral equivalent)
Rectal	99.6°F
Auxiliary	97.6°F





Baseline Vitals - Oxygen Saturation

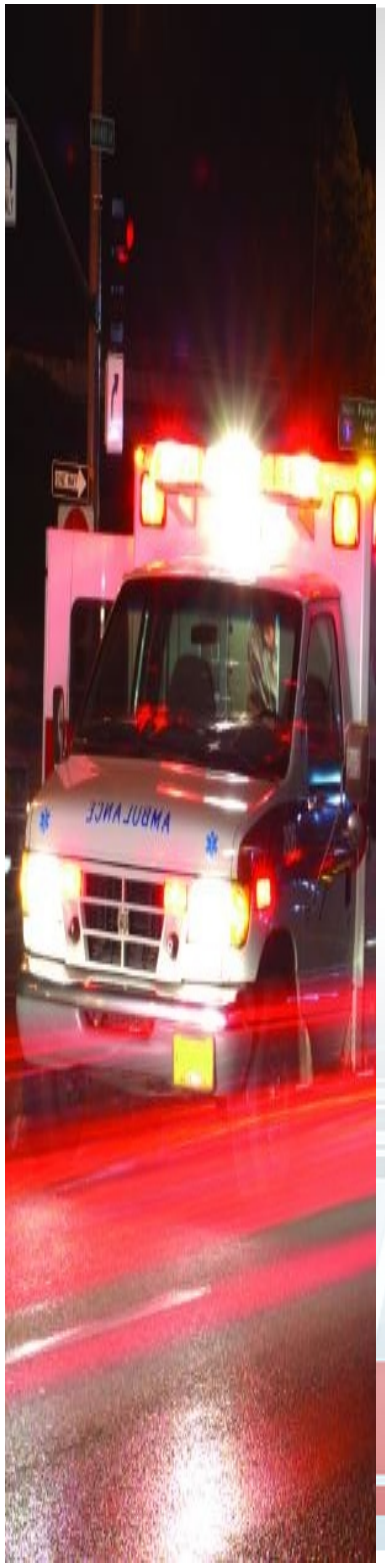
Oxygen Saturation (SpO2) measures the percentage of hemoglobin in your red blood cells that carry oxygen

Pulse Oximetry is a noninvasive device that measures the oxygen saturation level (SpO2) in your blood by shining light at specific wavelengths through tissues.



Emergency Preparedness



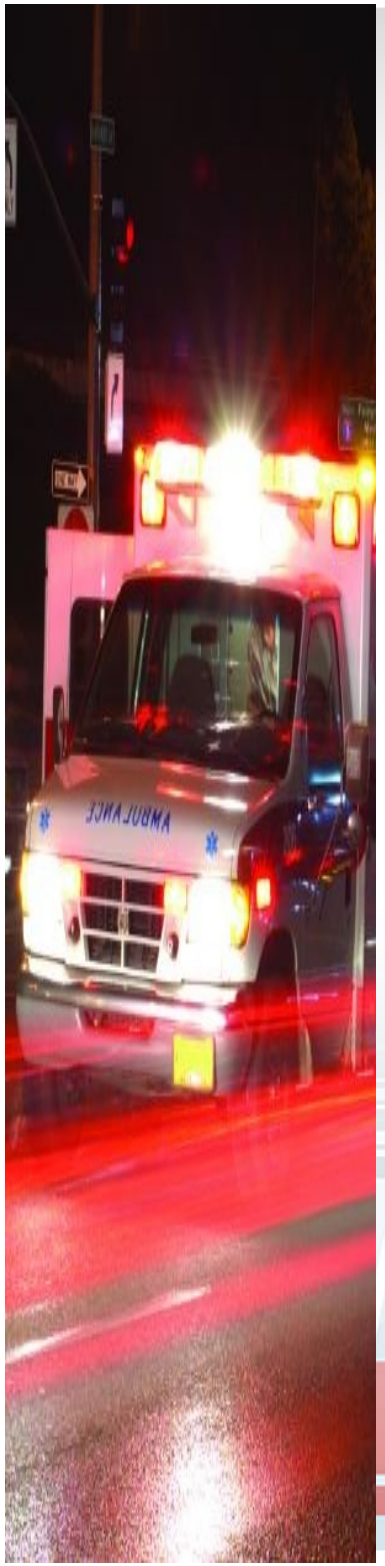


Emergency Preparedness

- Emergency Equipment
- Emergency Medications
- Emergency Plan
- Emergency Training
- Mock Drills/Simulations



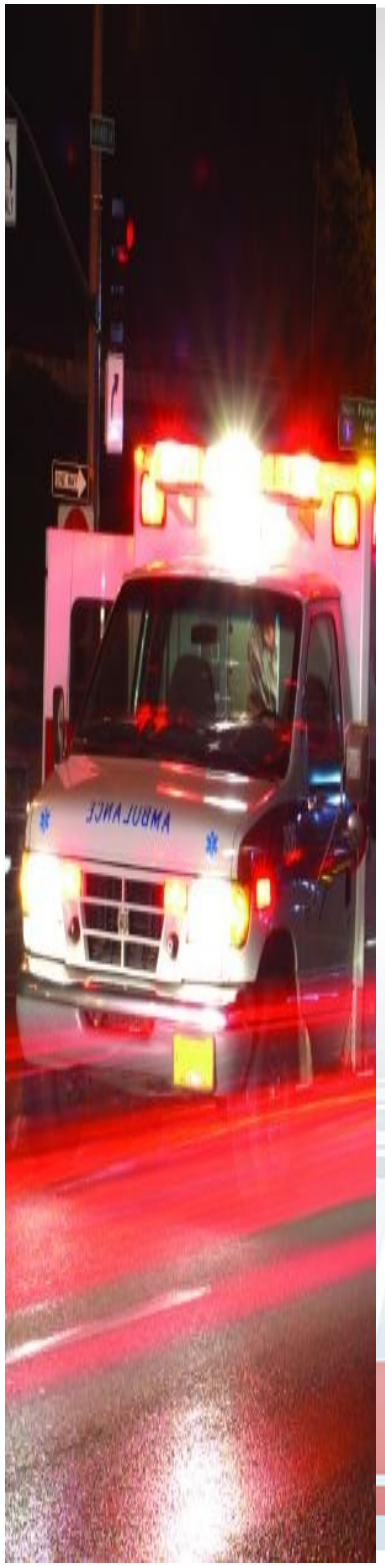




EMERGENCY EQUIPMENT

- Operating dental chair or table which allows the TEAM to maintain the patients airway, altar the position of the patient (i.e. trendelenberg), and to provide a firm platform for the management of cardiopulmonary resuscitation.



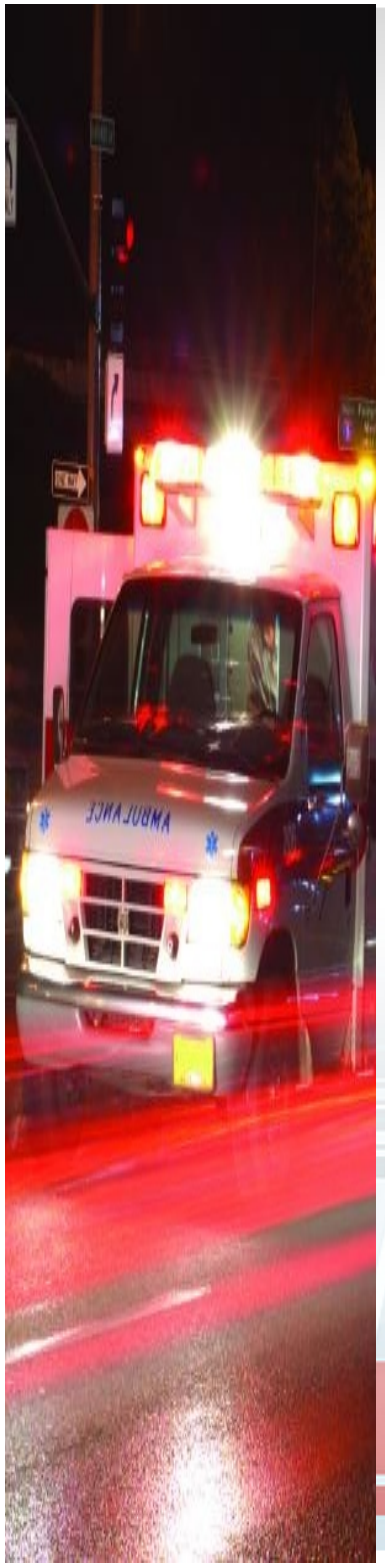


EMERGENCY EQUIPMENT
LIGHTING SYSTEM

- Lighting system which is adequate to permit the evaluation of the patients skin and mucosal color.

- Backup lighting system which is powered by batteries and of sufficient intensity to permit completion or closure of operation at the time of a power failure.

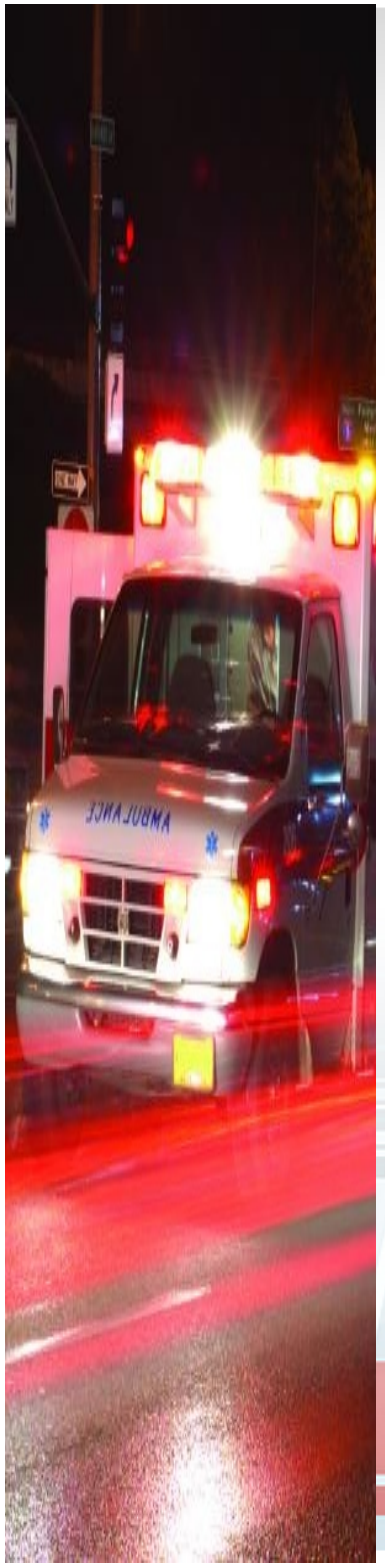




EMERGENCY EQUIPMENT
SUCTION EQUIPMENT

- Suction equipment which permits aspiration of oral and pharyngeal materials.
- A battery powered backup mobile suction device which can operate during a power failure.

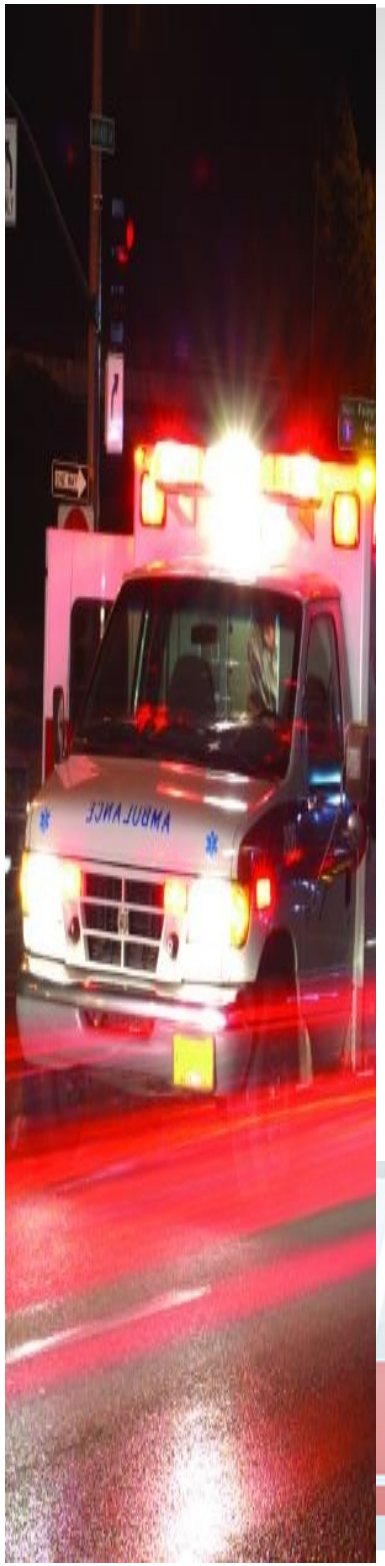




EMERGENCY EQUIPMENT
OXYGEN DELIVERY SYSTEM

- Oxygen delivery system with adequate full face masks and appropriate connectors that is capable of administering >90% oxygen at a flow rate of 10 liters/minute for at least one hour.

- Backup oxygen delivery system [660L E-cylinder oxygen tank - green] with adequate full face masks and appropriate connectors that is capable of administering >90% oxygen at a flow rate of 10L/minute for at least one hour.



EMERGENCY EQUIPMENT







Basic

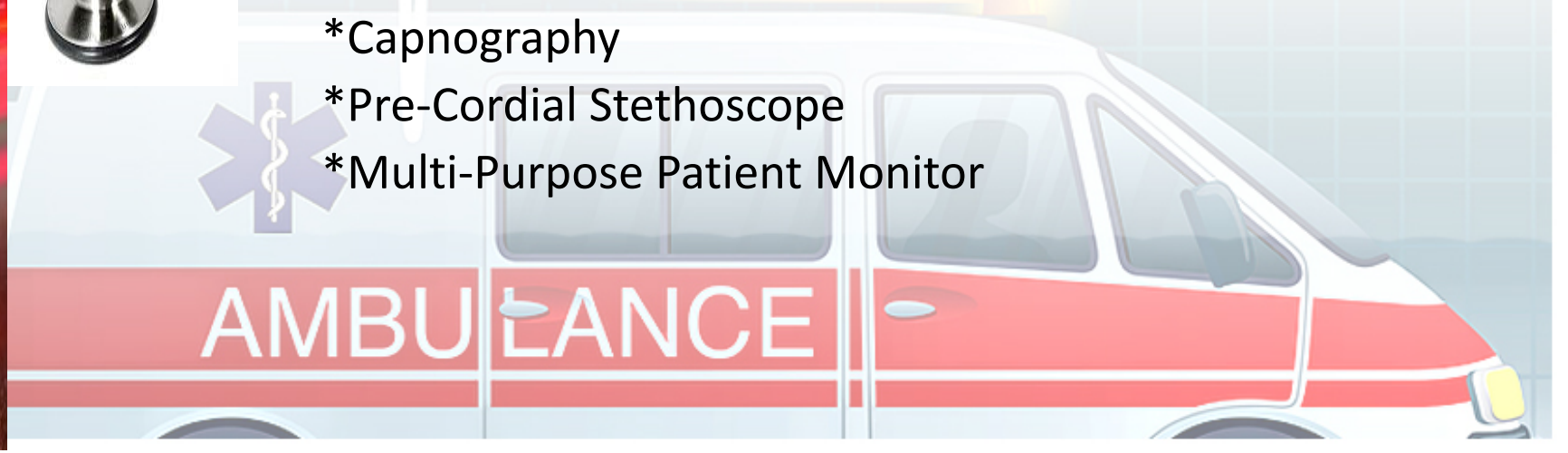
- Blood Pressure Cuff
- Pulse Oximeter
- Temperature
- Stethoscope





Advanced Monitoring

- *ECG
- *Capnography
- *Pre-Cordial Stethoscope
- *Multi-Purpose Patient Monitor



Emergency Equipment

Every office should have immediate access to an Automatic External Defibrillator (AED).

- The AED recognizes pulseless ventricular fibrillation (VF) or rapid ventricular tachycardia (VT), and then allows the operator to administer “shocks” to convert the patient’s rhythm back to normal.
- The AED is equipped with a voice prompt that leads the user through its usage and requires no specialized training.

Note: For every minute that lapses before defibrillation, the survival rate decreases by 10%.



Emergency Medications

Oxygen + Airway Adjuncts

- **Use for:** significant respiratory distress, chest pain, altered mental status, seizure recovery, anaphylaxis, suspected stroke, overdose, etc.
- **Typical flow:** nasal cannula **2–6 L/min**; non-rebreather **10–15 L/min**.



Emergency Medications

Epinephrine 1:1000 0.3-0.5mg EPI-PEN/IM/SQ used to treat anaphylaxis resulting from allergic reactions

- **Stock:** 2 auto-injectors simplest **0.3 mg** and **0.5 mg**
- **Indication:** anaphylaxis (hives + respiratory symptoms, swelling, hypotension).
- **Dose (adult/teen): 0.3–0.5 mg IM**; repeat **q5–15 min** if needed.



Emergency Medications

Albuterol MDI (90 mcg/puff) + spacer

- **Indication:** bronchospasm/asthma, wheezing.
- **Dose (adult/teen): 2 puffs**, may repeat every few minutes as needed; use **spacer** when possible.



Emergency Medications

Diphenhydramine

- **Indication:** allergic reaction (hives/itching) and **adjunct** after epinephrine in anaphylaxis.
- **Dose (adult/teen): 25–50 mg** PO/IM.



Emergency Medications

Aspirin (chewable)

- **Indication:** suspected acute coronary syndrome (MI).
- **Dose: 160–325 mg chewed**.
- **Avoid if:** true aspirin allergy, active major bleeding. (If uncertain, call EMS early and follow dispatcher guidance.)



Emergency Medications

Nitroglycerin 0.4 mg SL (spray or tablets)

- **Indication:** suspected angina/ischemic chest pain with adequate BP.
- **Dose: 0.4 mg SL**, repeat every **5 min** up to **3 doses.**
- **Do NOT give if:** SBP < ~90–100, severe dizziness/hypotension or taken **PDE-5 inhibitors** (sildenafil/vardenafil <24h; tadalafil <48h).



Emergency Medications

Ammonia Inhalants assists in improving consciousness for patients who have fainted (Syncope)



Emergency Medications

Glucose (oral)

- **Stock:** glucose gel and/or tablets; also juice/sugary drink.
- **Indication:** hypoglycemia **when patient can swallow and follow commands**.
- **Dose: 15– g** rapid; recheck in ~15 min; repeat if needed.

Glucagon

- **Indication:** severe hypoglycemia when patient **cannot safely swallow** (or is unconscious) and no IV dextrose available.
- **Dose (adult/teen): 1 mg IM** (or intranasal per product).
- **Note:** nausea/vomiting common—place in recovery position, protect airway.

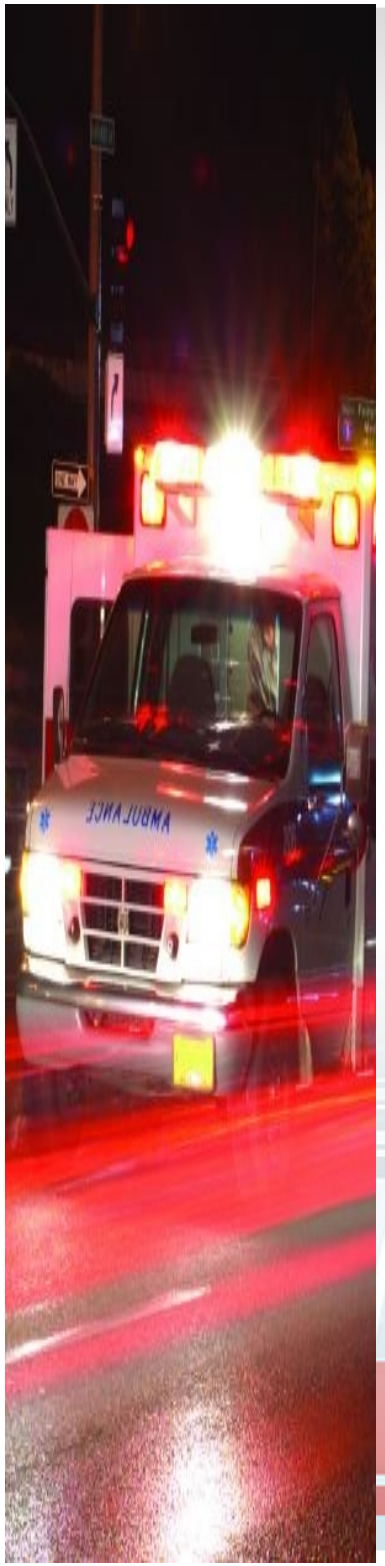


Emergency Medications

Naloxone (Intranasal)

- **Indication:** suspected opioid overdose with respiratory depression (including prescription opioids).
- **Dose: 4 mg IN**, repeat **q2–3 min** as needed; support ventilation/BVM and call EMS.





EMERGENCY

AIRWAY RESCUE DEVICES



Devices for Airway Rescue

- Oral airways
  - Effective in displacing the tongue from the posterior pharynx and opening the airway
  - Airway inserted with the point towards the roof of the mouth and then inverted as the pharynx is reached
  - Size selected by measuring the corner of the mouth to the earlobe

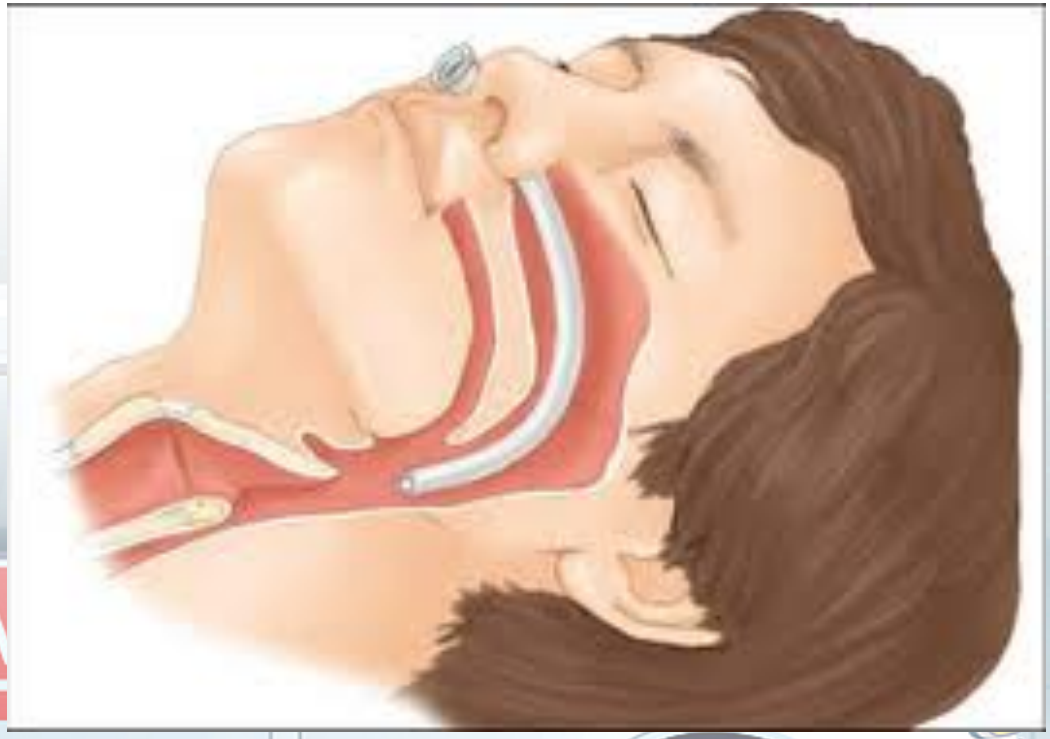




Devices for Airway Rescue

- Nasopharyngeal airways
  - May be more tolerated by a conscious patient than the oral airway
  - Size selected by measuring the tip of the nose to the earlobe
  - Apply lubrication and insert into nostril





Devices for Airway Rescue

- Laryngeal mask airway (LMA)
  - Soft and can be placed "blindly" and without the need for laryngoscopy
  - Wide range of pediatric sizes
  - Technique sensitive with respect to placement







Devices for Airway Rescue

- The I-Gel is a second generation S***upraglottic*** airway with a non-inflatable cuff, normally for use in anesthesia;
  - ◇ Easy insertion
  - ◇ Minimal risk of tissue compression
  - ◇ Stability after insertion
  - ◇ Latex free
  - ◇ Reduced risk of aspiration





Devices for Airway Rescue

Direct Video Laryngoscope



EMERGENCY EQUIPMENT

EMERGENCY KITS









EMERGENCY KITS

- Having well-equipped emergency kits **readily available** in the dental office is essential for **effectively managing medical emergencies** that may arise during patient care.
- Emergency kits should be **easily accessible, regularly maintained,** and include **essential supplies and medications necessary** for various emergency situations.





EMERGENCY KITS

- Emergency Kits organize their medications and contents into sections, compartments and trays.
- Are clearly labeled and categorized into key areas of care thus allowing the responder to quickly assess & treat the patient without searching for devices and medications.



EMERGENCY KITS

- Allow for **Rapid Response** to those needing life-saving care.
- They provide **Medications and Devices** to sustain **Basic Life Support (BLS), Advanced Cardiac Life (ACL) or Pediatric Advanced Life Support (PALS).**
- **Mobile kits** allows healthcare provider to bring the kit to patient.





EMERGENCY KITS

The emergency kit should be kept in a prominent, easily accessible location known to ***everyone*** in the office.

On a monthly basis, a designated member of the dental team should be responsible for checking ***all*** items to ensure that none of the drugs have passed their expiration date ***and*** all equipment is operational.

Make index cards which clearly state the indication, dosage, and administration of the drugs in the kit.



EMERGENCY KITS

- **Every dental office should have an Emergency Kit.**
- **There are commercially available kits or you can easily & inexpensively self-assemble your own kit.**
- **Personally, I recommend a commercially available kit.**



EMERGENCY KITS

Monitoring Devices:

- Blood pressure cuff
- Stethoscope
- Pulse oximeter for measuring oxygen saturation levels



EMERGENCY KITS
Basic (Airway)

Airway Management Devices

Nasal canula
Non-rebreather mask
Oropharyngeal Airways

Yankauer Suction
Magill Forceps
Ambu-Bag, Masks (diff sizes)



EMERGENCY KITS

Oxygen Delivery:

- Portable oxygen tank with regulator and tubing
- Oxygen key/wrench for tank adjustment



EMERGENCY KITS

Medications:

- Epinephrine auto-injectors (e.g., EpiPen) for anaphylaxis
- Nitroglycerin tablets or spray for angina
- Aspirin (chewable) for suspected heart attack
- Bronchodilator inhaler (e.g., albuterol) for respiratory distress
- Oral glucose gel or tablets for hypoglycemia



EMERGENCY KITS

Emergency Protocols and Contact Information:

- Printed copies of emergency protocols and algorithms for common medical emergencies
- Emergency contact numbers for local emergency services and medical facilities



Emergency Plan



Emergency Plan

- It is important that every dental office **have an established and written Emergency Plan** for handling emergencies.
- The **Office Emergency Plan** should be updated and practiced regularly at periodic staff meetings.
- A specific C**ode Word or Phrase** should be used to indicate an emergency for the Staff so as not to alarm/upset other patients or family members.



Emergency Plan

- **Emergency numbers** such as 911 should be posted conspicuously at every phone in the office.
- **Additional emergencies phone numbers** can also be posted. For example - hospital emergency department, fire department, dentist anesthesiologist, oral surgeon, physician.



Emergency Plan

What to say during an emergency call?

Information to provide when calling emergency medical services (9-1-1).*

- Preliminary diagnosis (for example, "possible myocardial infarction")
- Information about the patient (for example, "58-year-old man with chest pain; conscious; blood pressure of 152 over 90; heart rate of 84 beats per minute")
- What is being done for the patient (for example, "The patient is being given 6 liters of oxygen per minute by face mask")
- Provide exact street address with office number and names of cross streets, if possible (for example, "Dr. Jones's dental office at 123 Main St., Suite 202, one block east of the intersection at Pine and Oak streets")
- Telephone number from which the call is being made



Emergency Plan

- Every member of the dental staff should have a **Specific Assignment** in an emergency.
- In order to compensate for variations in staffing, **assignments should be rotated** so that all staff are familiar with all tasks.
- **Mock scenarios** of various emergency situations can be developed which will allow each staff member to act out their assigned roles.



Emergency Plan

Office emergency team

Team member	Responsibilities
Member #1 (first person on scene of emergency)	1. Remain with victim 2. Activate office emergency system 3. Basic life support as necessary
Member #2	1. Bring emergency equipment* to scene
Member #3 (and other members of the dental office staff)	1. Assist as necessary a. Activate emergency medical services b. Meet and escort EMS to office c. Assist with basic life support d. Prepare emergency drugs for administration e. Monitor and record vital signs

*Emergency equipment includes oxygen supply, emergency drugs, and, when appropriate, an automated external defibrillator



Emergency Plan

New staff should:

(1) review the written office emergency manual.
(2) be given a specific emergency assignment.
(3) be shown the location of all emergency equipment and how to use it.
(4) participate in practice situations.

Emergency TEAM Task(s)
Receptionist • Call EMS (911) or local emergency number • Calm persons in reception area • Direct rescue squad to patient
Dental Assistant 1 • Maintain C-A-B of CPR • Place patient in appropriate rescue position • Assess and record vital signs; relay to emergency personnel
Dental Assistant 2 or Hygienist • Bring emergency kit/oxygen to chairside • Prepare medications for dentist • Turn to appropriate page in emergency reference
Dentist • Direct other team members and overall treatment • Administer emergency medications



Emergency preparedness checklist.*

- All staff members have specific assigned duties.
- Contingency plans are in place in case a staff member is absent.
- All staff members have received appropriate training in the management of medical emergencies.
- All clinical staff members are trained in basic life support for health care providers.
- The dental office is equipped with emergency equipment and supplies that are appropriate for that practice.
- Unannounced emergency drills are conducted at least quarterly.
- Appropriate emergency telephone numbers are placed prominently near each telephone.
- Oxygen tanks and oxygen delivery systems are checked regularly. Other emergency respiratory support equipment is present, in good working order and located according to the emergency plan.
- All emergency medications are checked monthly and replacements are ordered for specific drugs before their expiration dates have passed.
- All emergency supplies are restocked immediately after use.
- One staff member is assigned the task of ensuring that the above procedures have been completed and to document this checklist review.



Emergency Training

Each year, the entire dental team should certify in Basic Life Support (BLS) and Cardiopulmonary Resuscitation (CPR) for healthcare providers.

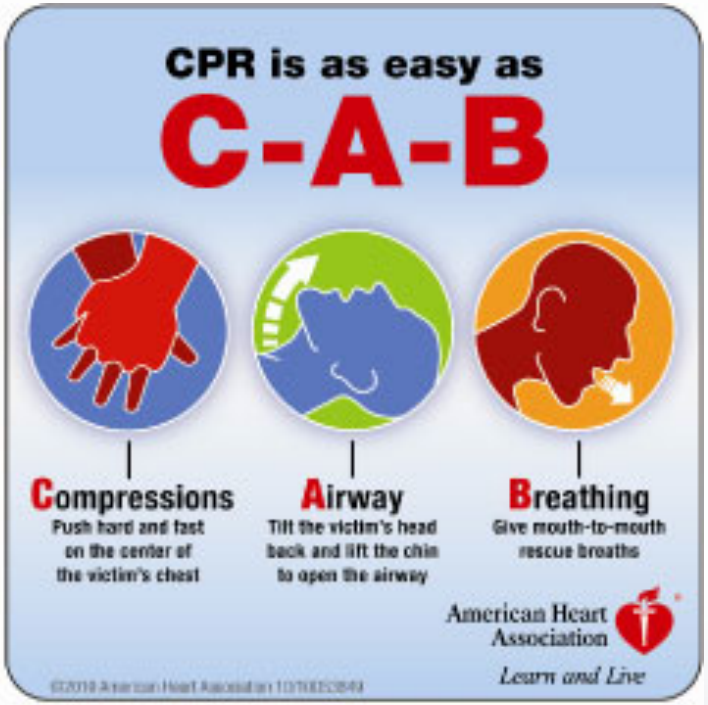
- Also, I highly recommend a *Basic First Aid Course* which would provide the staff with information on Emergency Care in common injury situations such as the control of bleeding, treatment of burns, and the handling of sprains and fractures.

Ideally, the entire staff should take the CPR refresher course together – TEAM. Learning how to work effectively together.

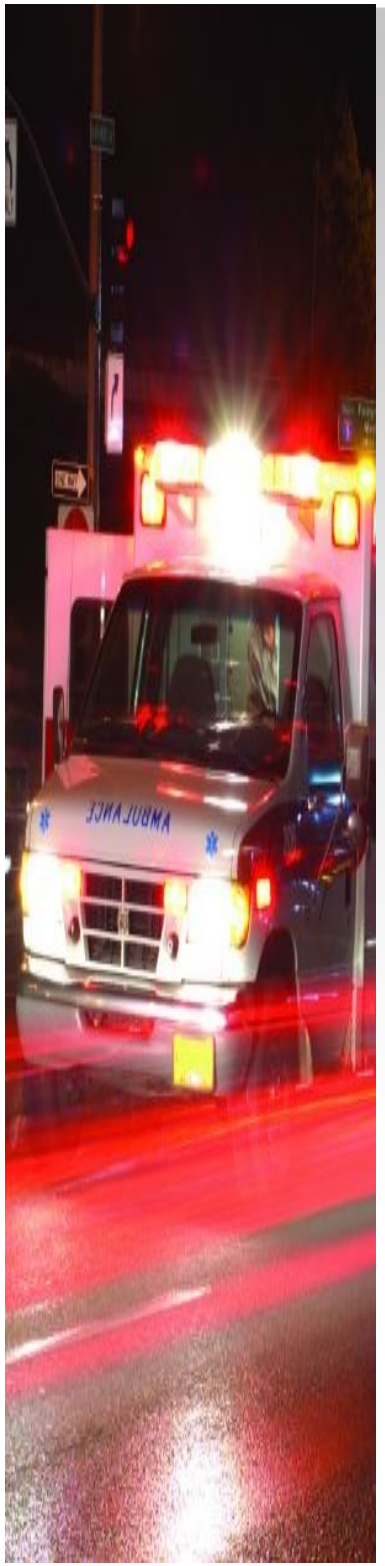


Emergency Training

It is highly recommended that offices that provide Oral Conscious Sedation, IV Conscious Sedation, and/or General Anesthesia take ACLS and PALS once a year.







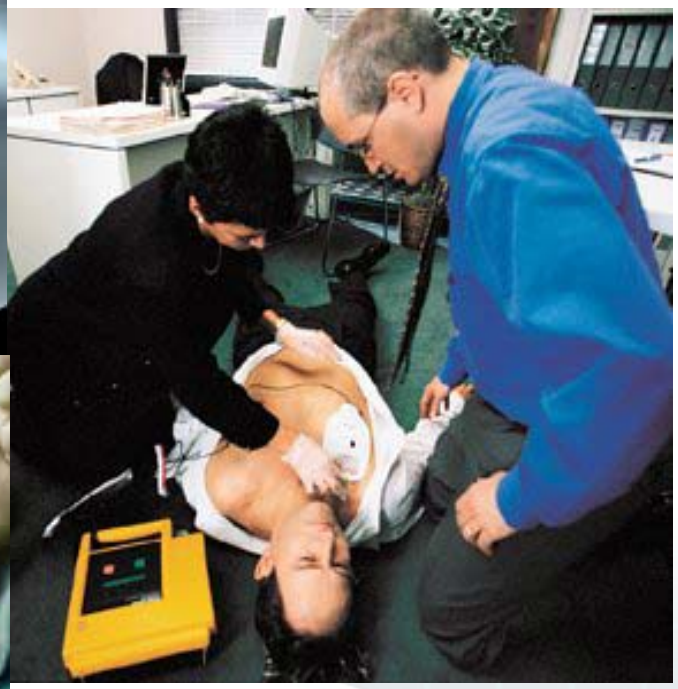
MOCK DRILLS and SIMULATIONS

- Regular, hands-on mock drills for dental office are crucial for ensuring team readiness and improving patient safety
- Monthly sessions **are recommended** to practice role delegation, 911 activation, and equipment handling.
- Key scenarios include syncope, anaphylaxis, cardiac arrest, seizures, and drug overdoses, using BLS protocols and simulated high-fidelity mannequins.

MEDICAL EMERGENCIES









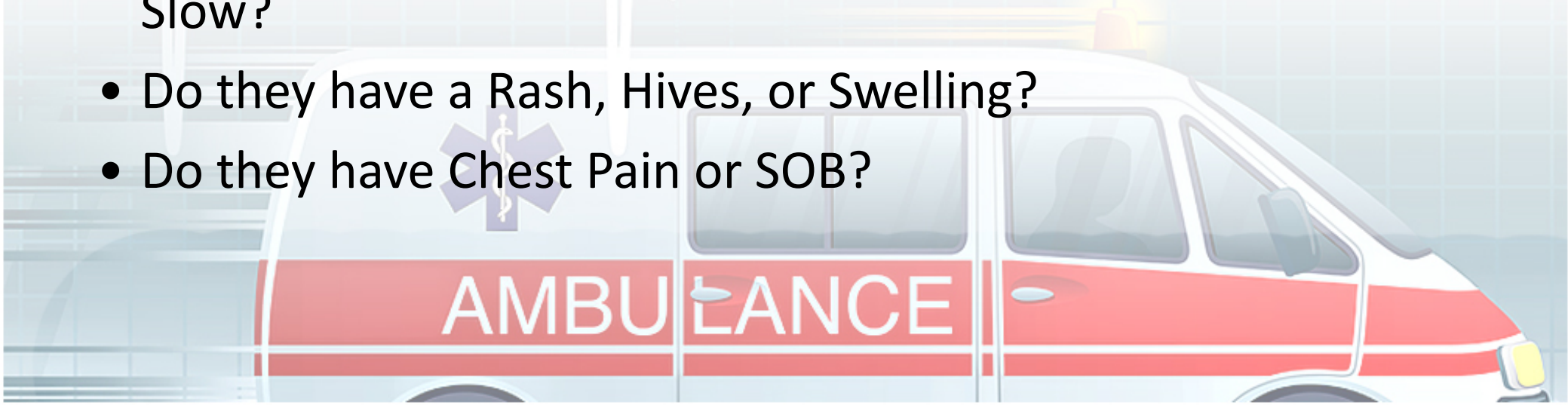
- RECOGNITION
- STOP
- ACT - Call for Help, Active Office Plan/Emergency Kit/O2/AED
- POSITION - Upright, Semi-Supine, Supine, Trendelenburg
- ASSESSMENT - ABCDE
- VITALS/Monitors - HR, RR, BP, Pulse Ox, Temp
- ACTIVATE EMS



EMERGENCY ALGORHYTHM

Access by asking questions to yourselves:

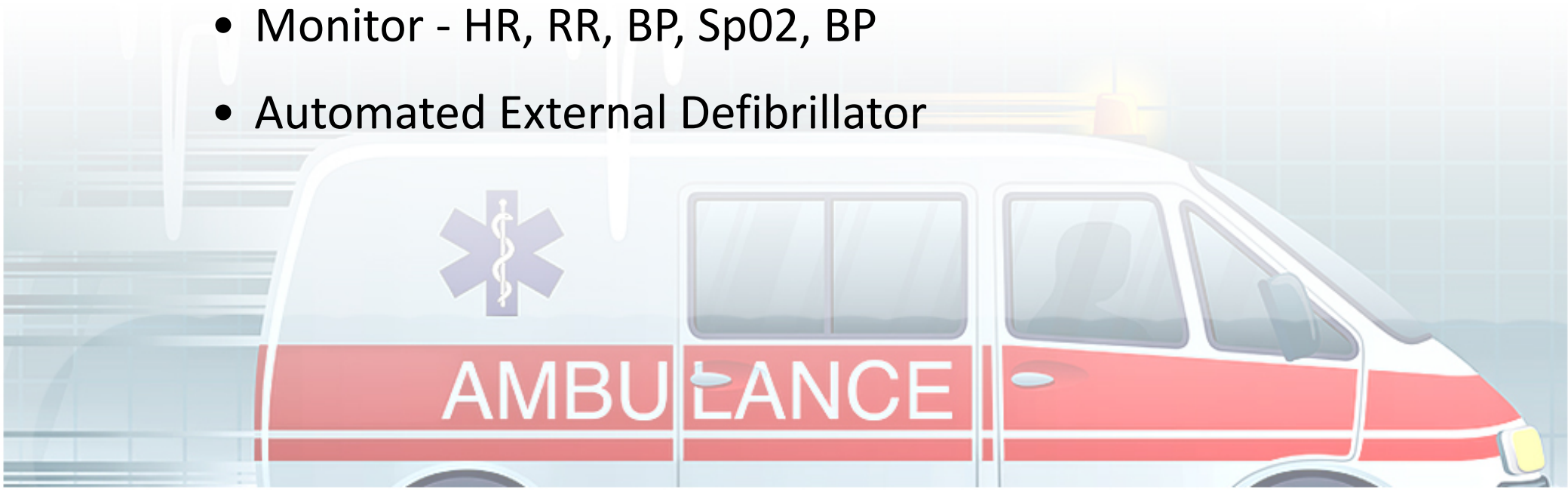
- Consciousness: Are they Responsive or Unresponsive?
- Breathing: Are they breathing or not breathing? Is their respirations normal or abnormal?
- Circulation: Do they have a pulse? Is their pulse to Fast or to Slow?
- Do they have a Rash, Hives, or Swelling?
- Do they have Chest Pain or SOB?



EMERGENCY ALGORHYTHM

ACT IMMEDIATELY:

- Call for Help
- Active Office Plan
- Oxygen - nasal cannula, facemask(s), BVM,Emergency Kit
- Monitor - HR, RR, BP, Sp02, BP
- Automated External Defibrillator



EMERGENCY ALGORHYTHM

POSITION:

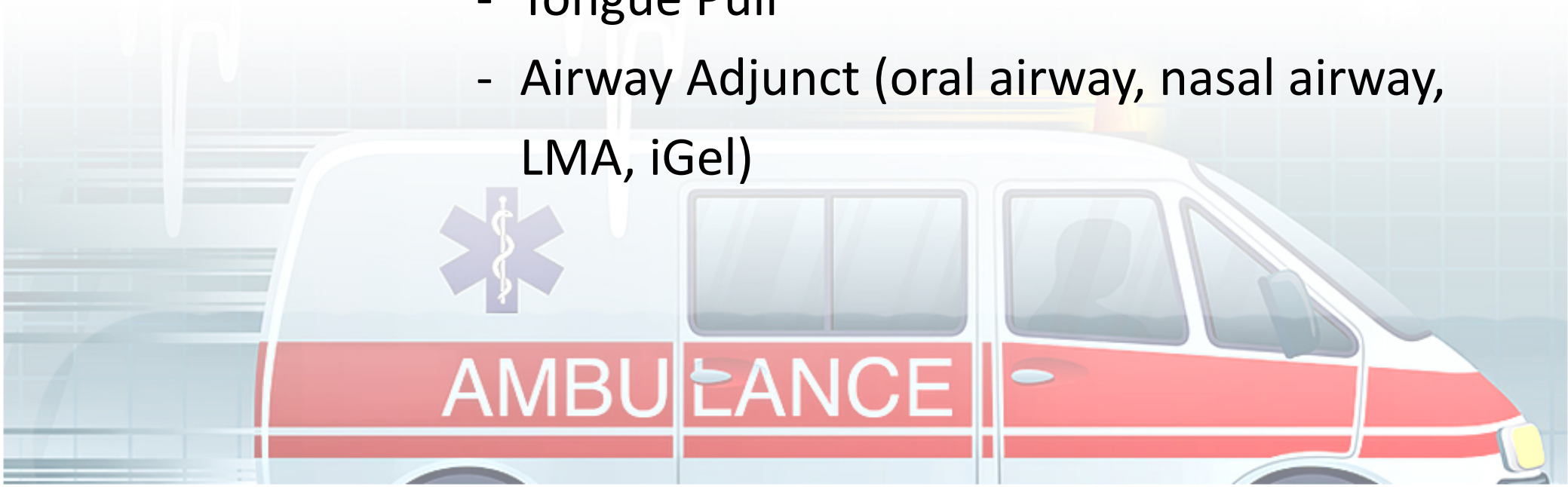
- Position the patient according to the emergency (e.g., supine for syncope/unconsciousness, upright for respiratory distress).
  - ✓Upright
  - ✓Semi-Supine
  - ✓Tripod Supine
  - ✓Trendelenburg



EMERGENCY ALGORHYTHM

ASSESSMENT - ABCDE:

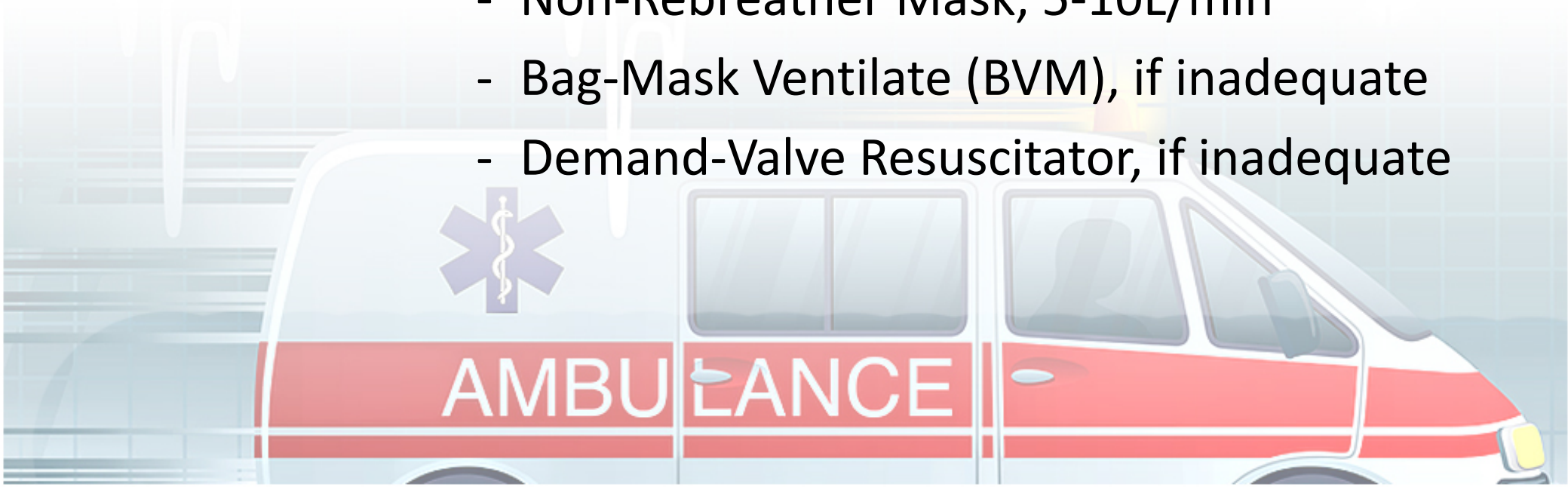
- **A**irway
  - Chin Lift
  - Jaw Thrust
  - Tongue Pull
  - Airway Adjunct (oral airway, nasal airway, LMA, iGel)



EMERGENCY ALGORHYTHM

ASSESSMENT - ABCDE

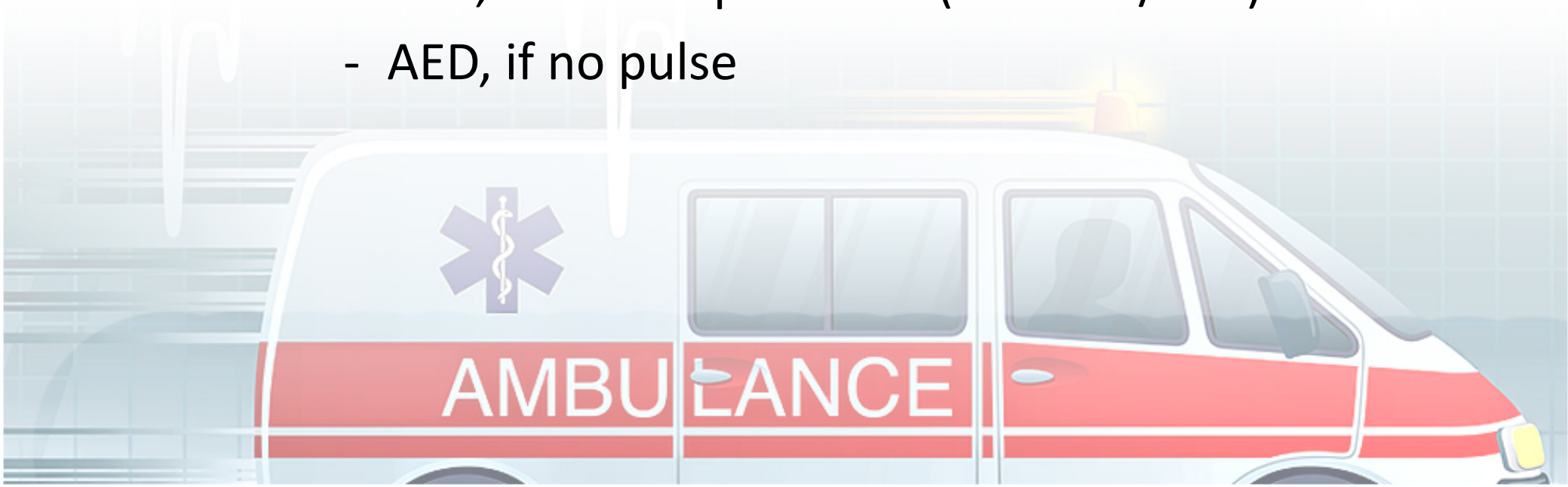
- **B**reathing
  - 100% Oxygen
  - Nasal Canula, 2-5L/min
  - Non-Rebreather Mask, 5-10L/min
  - Bag-Mask Ventilate (BVM), if inadequate
  - Demand-Valve Resuscitator, if inadequate



EMERGENCY ALGORHYTHM

ASSESSMENT - ABCDE

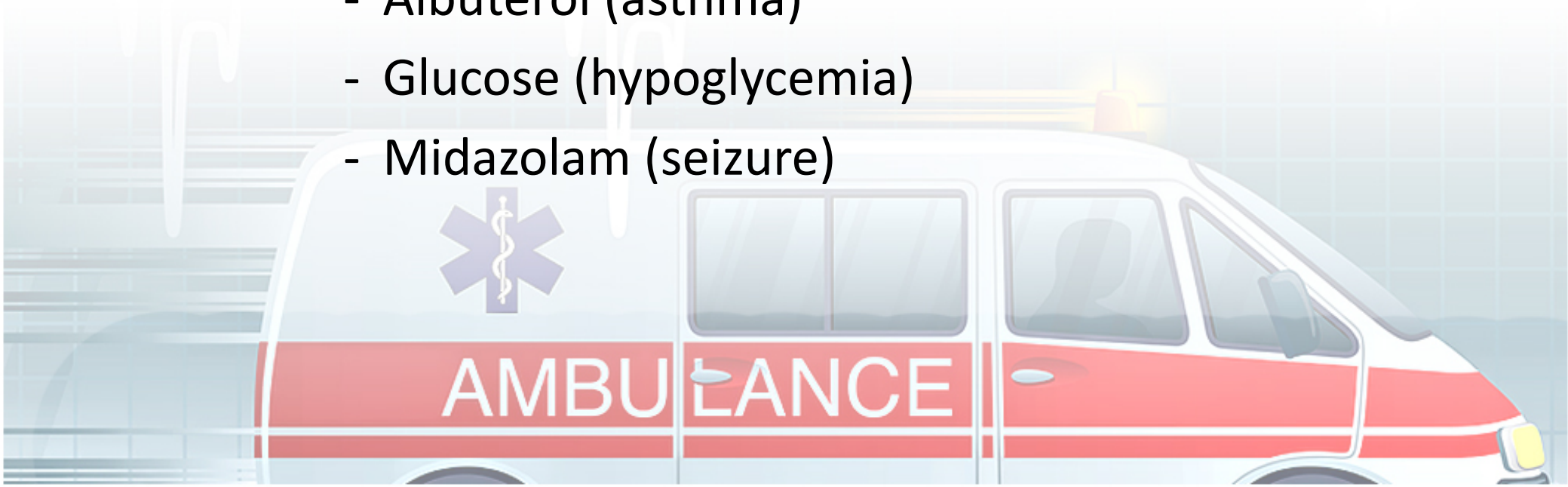
- **C**irculation
  - Check Pulse
  - Tachycardia/Bradycardia
  - CPR, start compressions (100-120/min)
  - AED, if no pulse



EMERGENCY ALGORHYTHM

ASSESSMENT - ABCDE

- **D**rugs
  - Epinephrine (anaphylaxis/cardiac arrest)
  - Nitroglycerin + Aspirin (myocardial infarction)
  - Albuterol (asthma)
  - Glucose (hypoglycemia)
  - Midazolam (seizure)



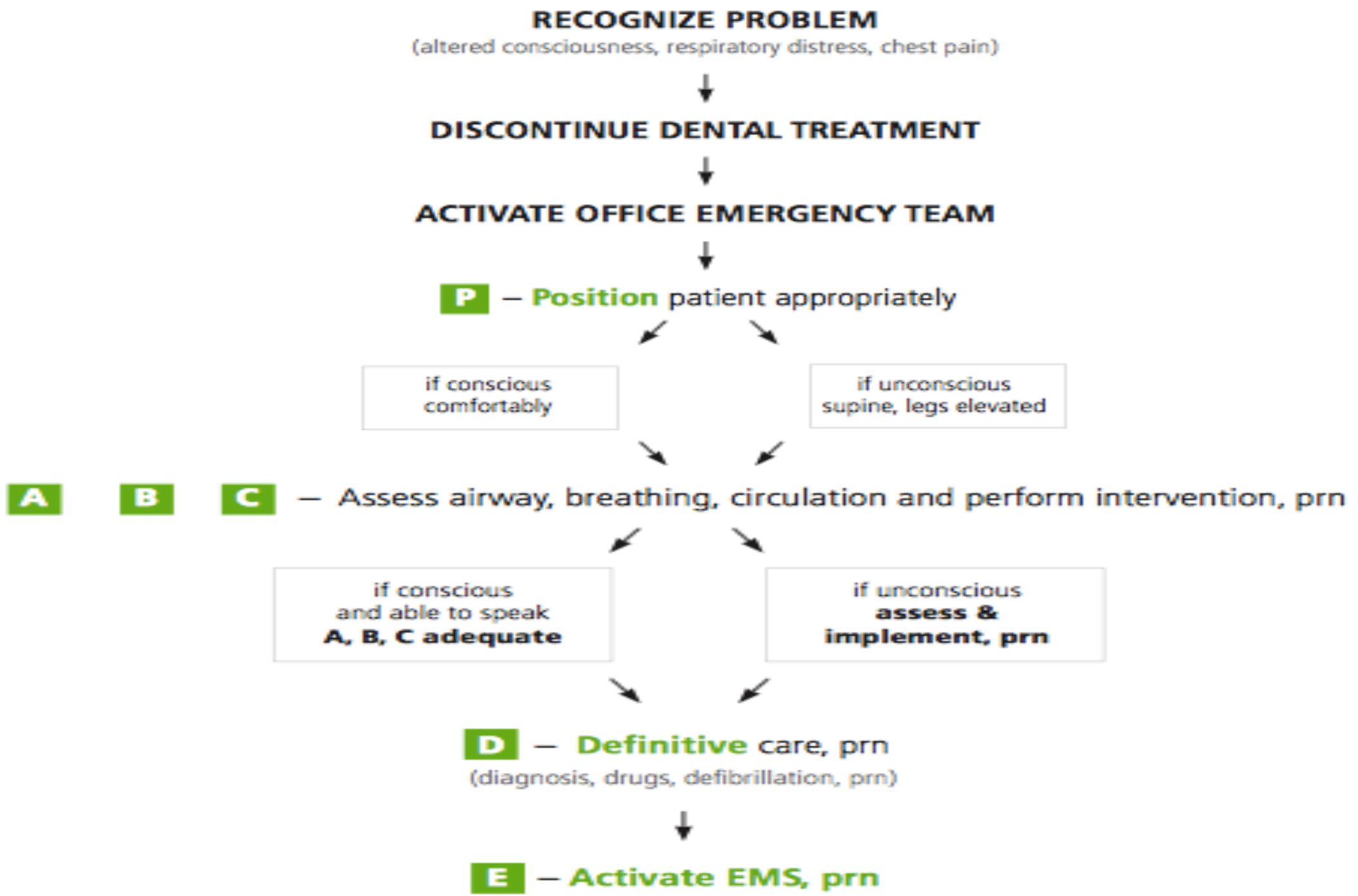
EMERGENCY ALGORHYTHM

ASSESSMENT - ABCDE

- **E**valuate & Document
- Monitor Vitals
- Prepare handoff to EMS



Algorithm for managing medical emergencies.



EMERGENCY RESPONSE (V O M I T)

ACTION PNEUMONIC:

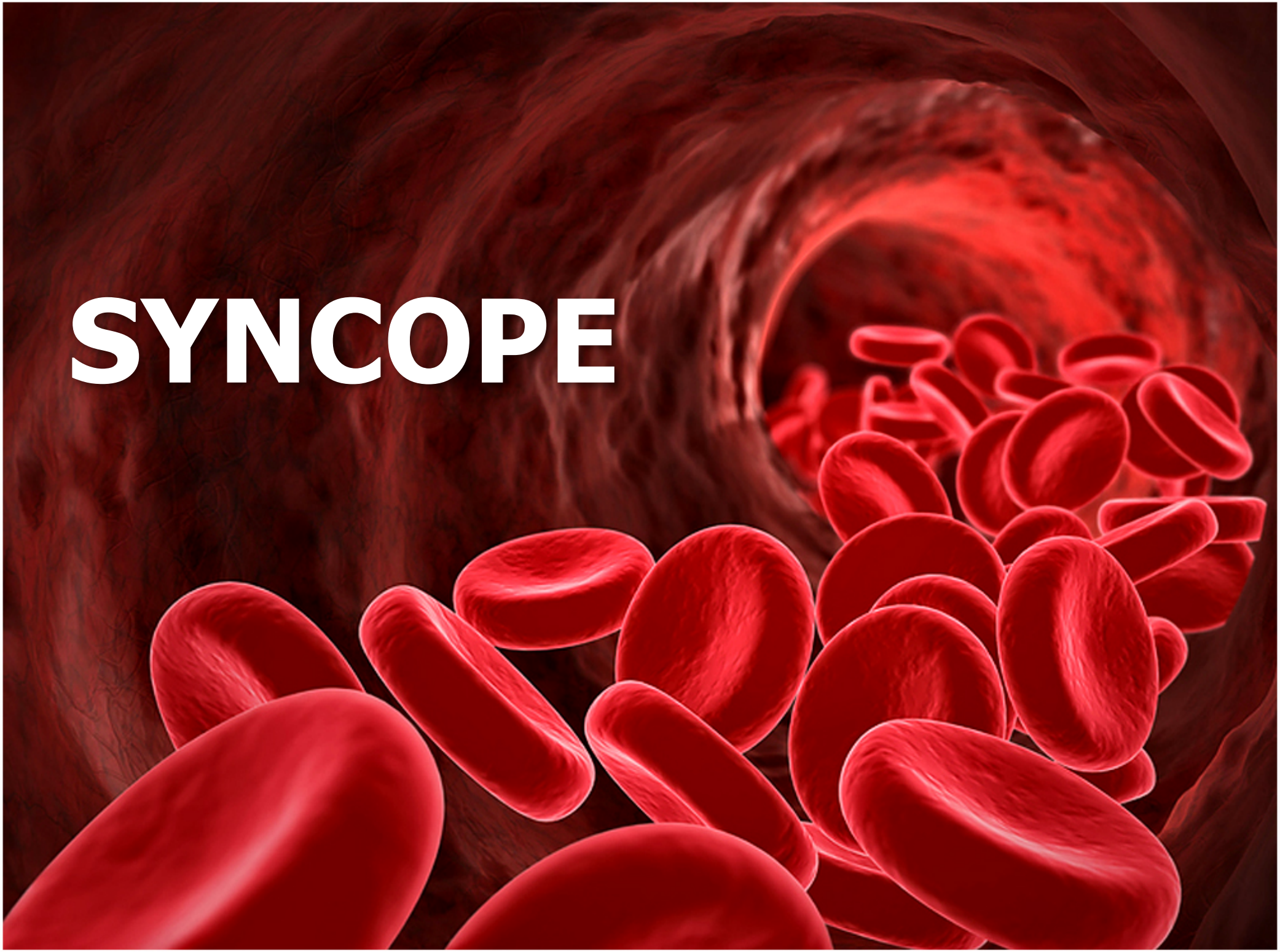
- **V**ITALS – Take Vitals: HR,RR,BP, O2 Sat.
- **O**XYGEN – Provide 2-10 L/min by cannula, facemask, BVM, or PPR
- **M**ONITORS – Place monitors. Continually access & reassess patient
- **I**NTRAVENOUS/INTRA-OSSEOUS ACCESS – Advance training
- **T**REATMENT – Treat specific emergency and provide BLS and/or ACLS until EMS arrives and takes over.





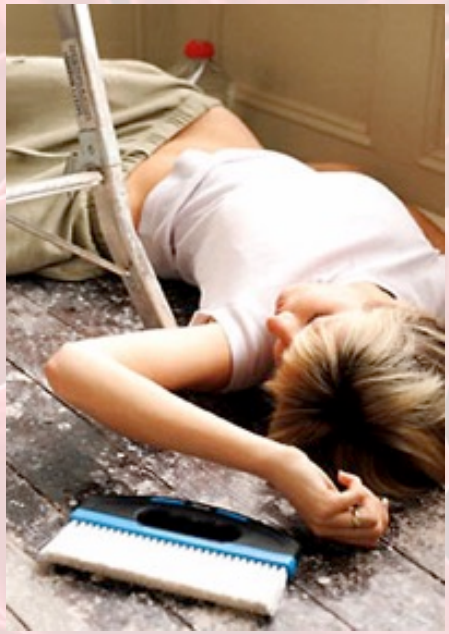
MEDICAL EMERGENCIES




SYNCOPE

SYNCOPE

- **DEFINITION**: Massive peripheral vasodilation leading to low cardiac output resulting in decreased cerebral blood flow which results in transient loss of consciousness.
- ***MOST COMMON EMERGENCY***.



SYNCOPE

CAUSES:

- Fear and anxiety
- Orthostatic/postural hypotension
- Cardiac conduction defects









SYNCOPE

PREVENTION:

- Medical History
- Stress Reduction Protocol
- Patient position
- Pre-Oxygenate

SYNCOPE

SYMPTOMS:

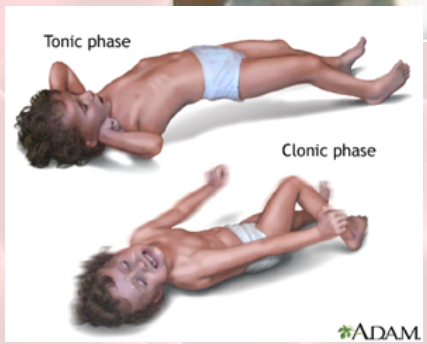
- Pale ashen-gray appearance
- Sweaty
- Nausea
- Eyes dilate (mydriasis)
- Convulsive movements











SYNCOPE

TREATMENT:

- STOP
- ACT - CALL for HELP (Emergency Kit, Oxygen, AED).
- POSITION - PLACE SUPINE with FEET ELEVATED.
- Administer 100% OXYGEN.
- MONITOR Vitals - heart rate, respirations, blood pressure, SpO2.
- Place cold moist towel to patients forehead and/or back of neck.







SYNCOPE

TREATMENT:

- If unconscious, use AMMONIA Inhalant
- If remains unresponsive, ACTIVATE EMS - call 911
- Remember your ABC's
- Assist Respirations, if needed



HYPOGLYCEMIA



HYPOGLYCEMIA



Definition

- Abnormal low levels of blood sugar (glucose)
  - Normal *60-100 mg/dL*
  - Glucose is the main fuel source for the brain
  - Glucose is not stored or synthesized in the brain

HYPOGLYCEMIA



Causes

- Diabetes
- Medications
- Alcohol Abused
- Hunger/Anorexia
- Tumors of Pancreas or Pituitary Gland

HYPOGLYCEMIA



Signs & Symptoms

- *Sweating*
- *Trembling*
- *Feelings of warmth*
- *Anxiety*
- *Nausea and/Vomiting*
- *Dizziness*
- *Confusion*
- *Tiredness*
- *Difficulty speaking*
- *Headache*
- *Inability to concentrate*

HYPOGLYCEMIA



Treatment:

- **STOP**
- **ACT** - Call for Help/Emergency Kit/Oxygen/AED
- **Position** - Comfortably
- **Administer Oxygen** 100%
- **Monitor** Vitals
- **Chem Stick** with Glucometer

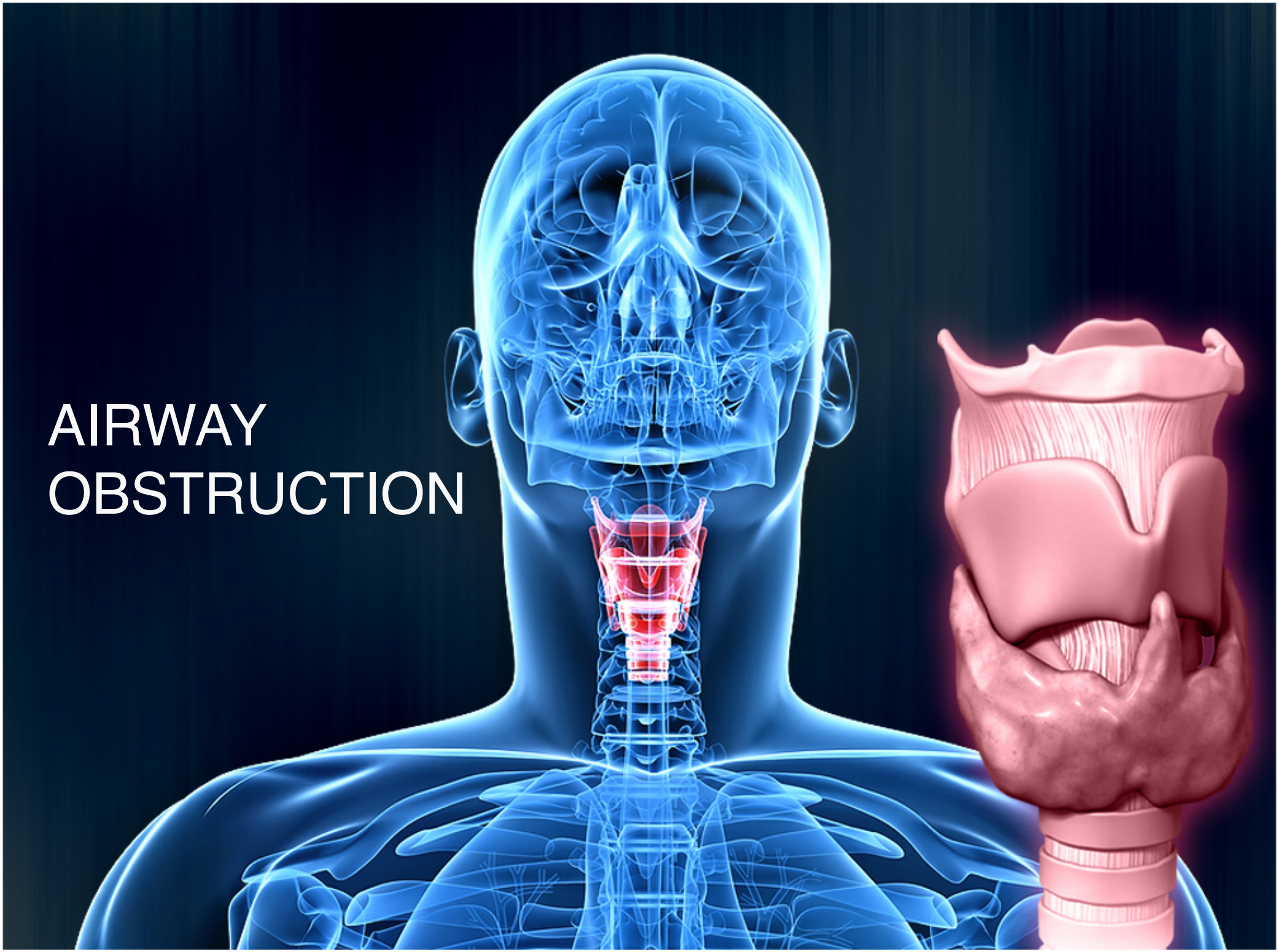


HYPOGLYCEMIA



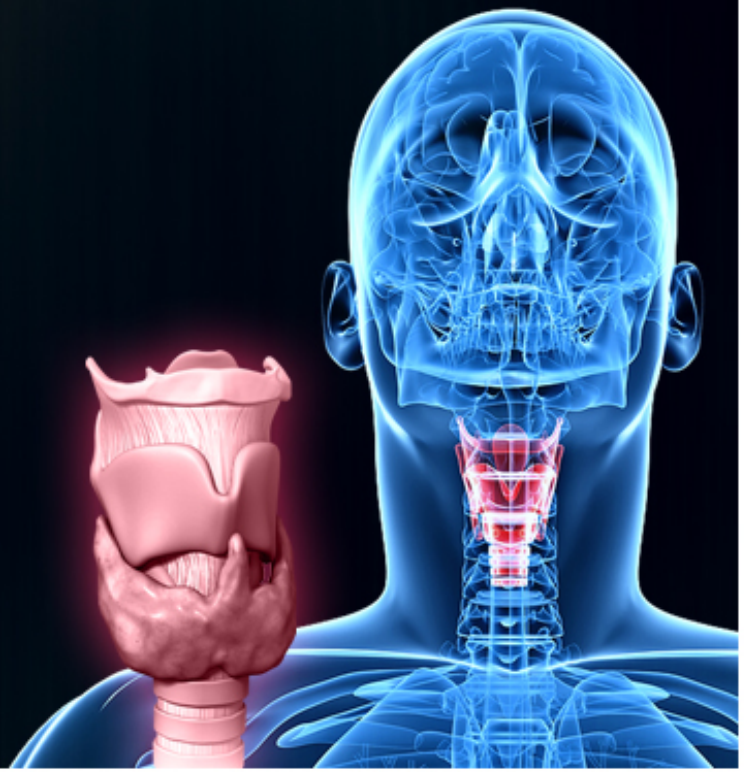
Treatment

- If **AWAKE & CONSCIOUS**:
  - ✓ **ADMINISTER** - Oral fluids with Sugar [Orange Juice, Coke, Pepsi].
- If **UNCONSCIOUS or Continued Unresponsive**:
  - ✓ **POSITION "Supine"**
  - ✓ **ADMINISTER - OXYGEN.**
  - ✓ **ABC's**
  - ✓ **ACTIVATE EMS - CALL 911**


AIRWAY
OBSTRUCTION

AIRWAY OBSTRUCTION

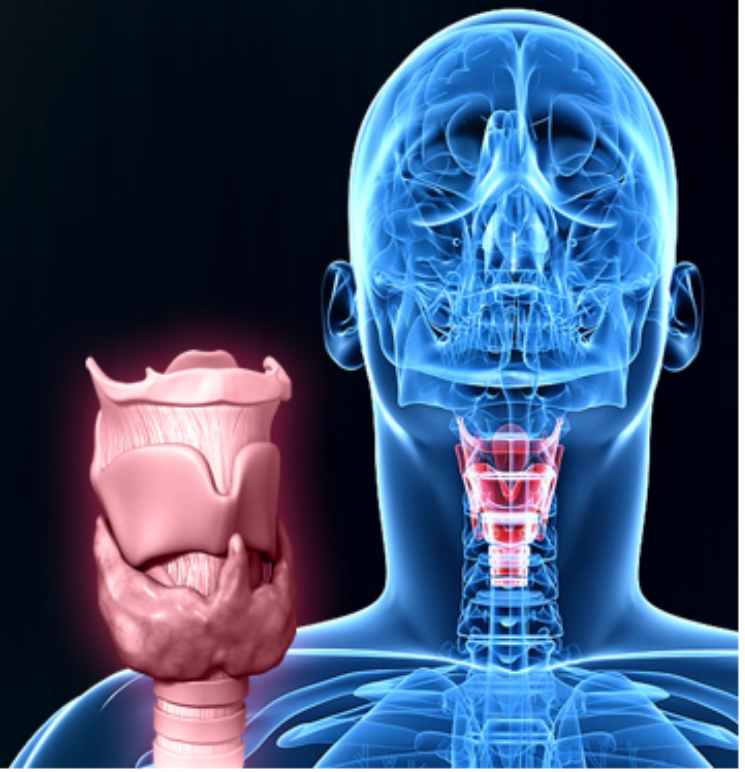
- DEFINITION: partial or complete obstruction of the airway. Frequently caused by object falling into the oral pharynx. Most serious are objects entering the larynx or trachea.



AIRWAY OBSTRUCTION

CAUSES:

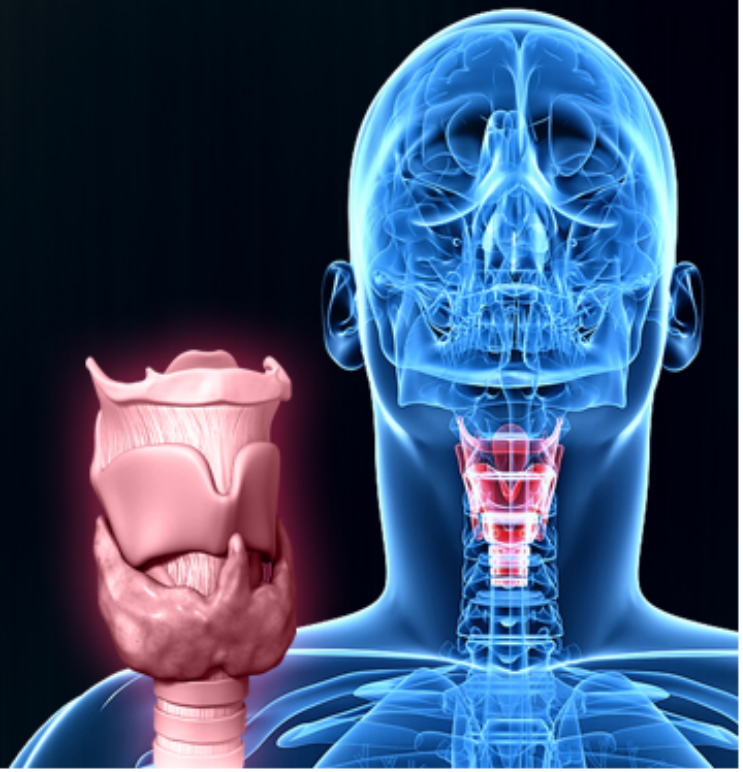
- Dental objects such as head of hand piece, mouth mirror, endodontic file, crown, extracted tooth, amalgam, or calculus



AIRWAY OBSTRUCTION

PREVENTION:

- Use rubber dam for restorative and endodontic procedures.
- Use "loose" throat screen for extraction or seating crowns (4x4 gauze).



AIRWAY OBSTRUCTION

SYMPTOMS:

- Noisy breathing is partial obstruction (Crowing).
- Victim gasping for breath with great effort.
- Retraction of suprasternal notch and/or intercostal regions during attempted inspiration.
- Silence/Complete Obstruction - patient unable to speak (universal sign).



AIRWAY OBSTRUCTION

TREATMENT:

- **STOP**
- **ACT** - Call for Help (Emergency Kit/Oxygen/AED)
- **<u>If CONSCIOUS</u> -** Perform Heimlich Maneuver.
  - - 5 Back Blows between the shoulder blades
  - - 5 abdominal thrusts. POSITION yourself behind the patient, wrap your arms around their abdomen, place one fist into abdomen (thumb side first) then place the other hand over the fist. Administer ABDOMINAL THRUSTS. Brisk inward and upward delivery (J thrust).
  - - Repeat 5-and-5, until obstruction clears or patient becomes unconscious.

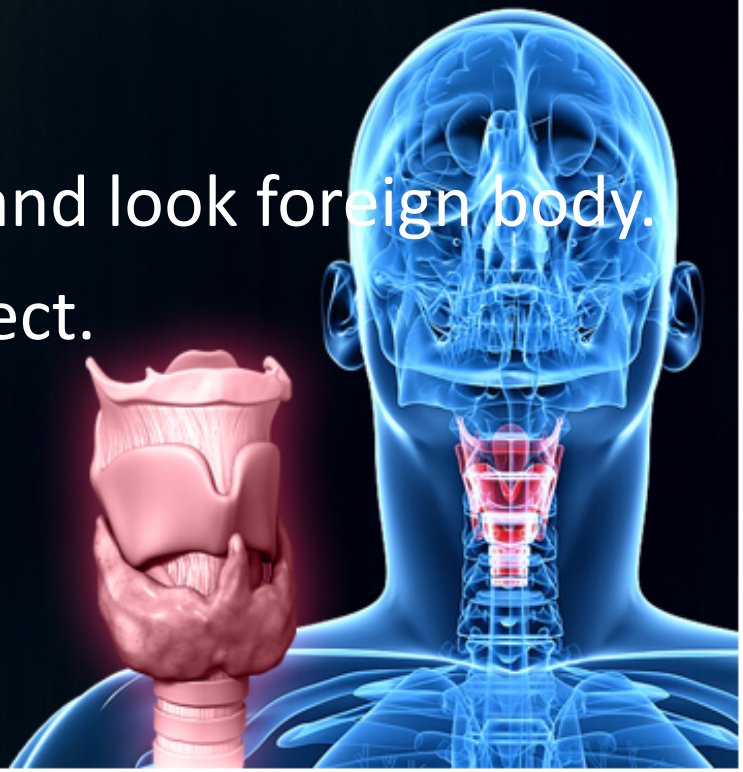


AIRWAY OBSTRUCTION

TREATMENT:

If **UNCONSCIOUS**;

- IMMEDIATELY **ACTIVATE EMS** - Call 911.
- Position in **SUPINE**.
- Start CPR (30:2)
- Administer 30 compressions.
- Before giving 2 breaths, open mouth and look foreign body.
- If object is visible, remove foreign object.
- NO BLIND FINGER SWEEPS.



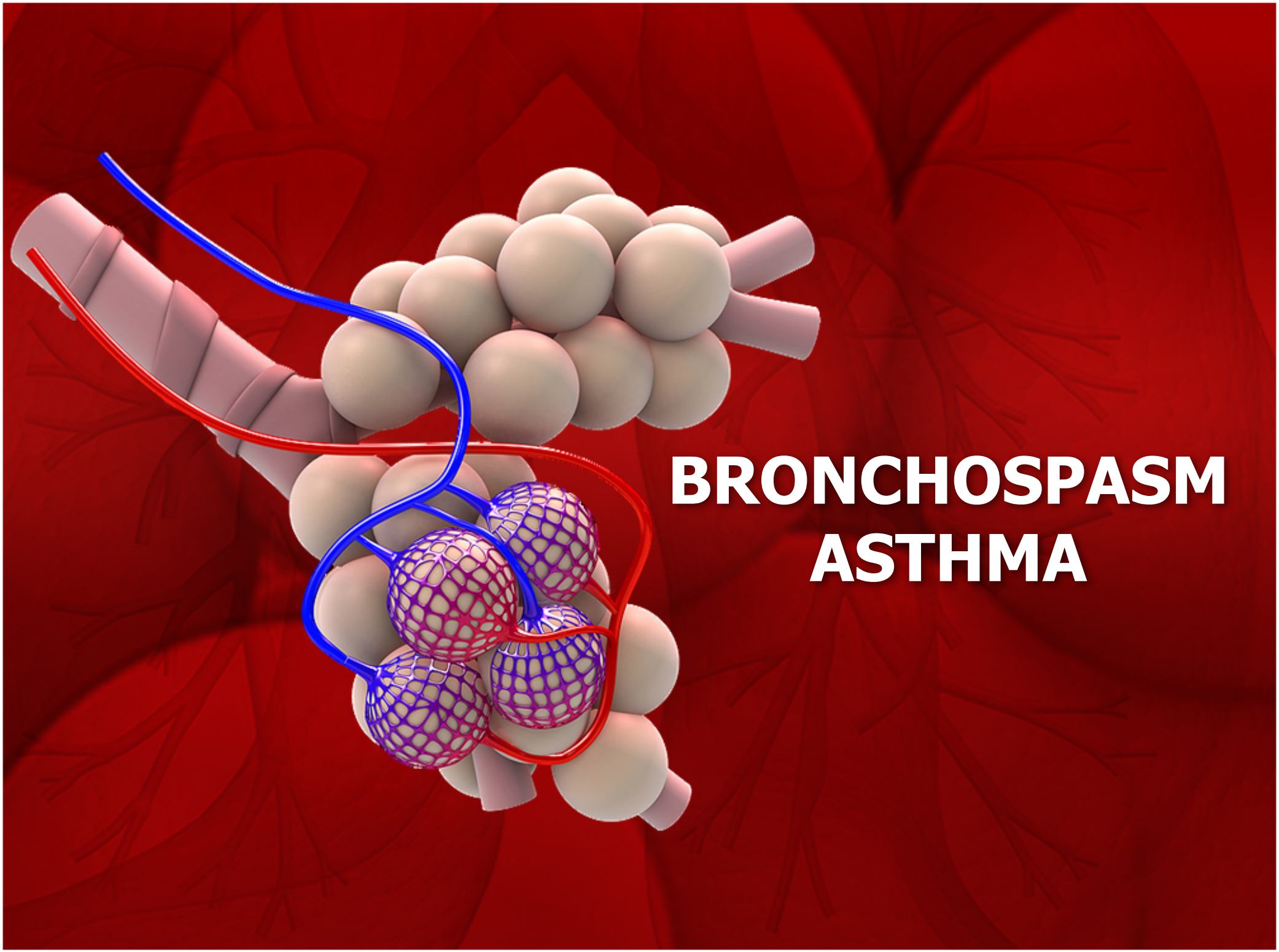
AIRWAY OBSTRUCTION

TREATMENT: (UNCONSCIOUS)

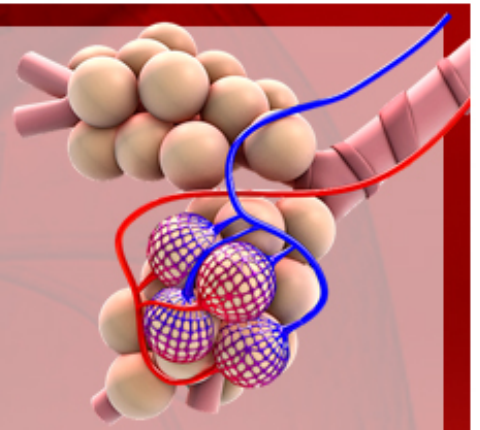
IF OBJECT is NOT VISIBLE and REMAINS,

- Continue CPR for 5 Cycles (2 minutes)
- REASSESS - Look into mouth
- REMOVE foreign body
- **IF Object remains** CONTINUE CPR until object dislodges




BRONCHOSPASM
ASTHMA

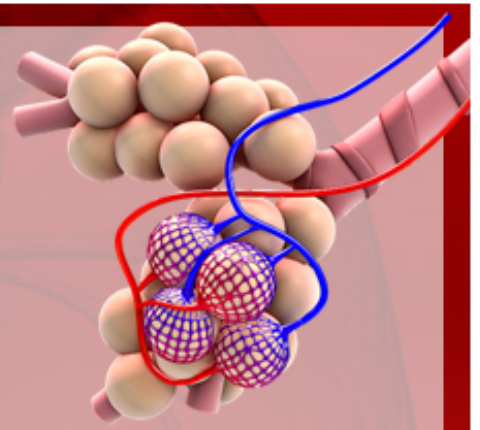
BRONCHOSPASM/ASTHMA



DEFINITION: partial or complete constriction of BRONCHIOLAR SMOOTH MUSCULATURE.

- **Frequently encountered in patients with a history of bronchial asthma, chronic bronchitis and/or recent upper respiratory infection.**

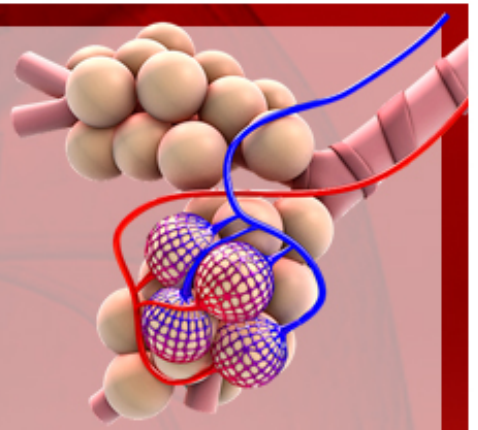
BRONCHOSPASM/ASTHMA



CAUSES:

- **Emotional stress.**
- **Allergy: antigen-antibody response.**
- **Vagal stimulation by mucous, blood, aspiration of gastric contents.**
- **Mechanical stimulation (i.e. intubation).**
- **Chemical stimulation (i.e. irritating vapors).**

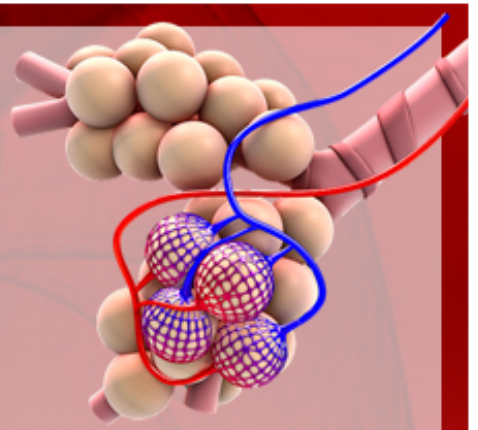
BRONCHOSPASM/ASTHMA



PREVENTION:

- **GOOD MEDICAL HISTORY.**
- **Pretreat with 2-4 puffs of Albuterol MDI 1 hour prior to procedure.**
- **Avoid irritating stimulus of upper airway.**

BRONCHOSPASM/ASTHMA



TREATMENT:

- **STOP**
- **ACT** - **Call** for HELP (Emergency Kit/Oxygen/AED).
- **POSITION** comfortably (Sitting Up/Semi-Supine).
- **Administer** 100% OXYGEN.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.



- **If MILD TO MODERATE**, give **ALBUTEROL MDI**: 4-8 puffs, may repeat 2-3 minutes.
- **If SEVERE,**

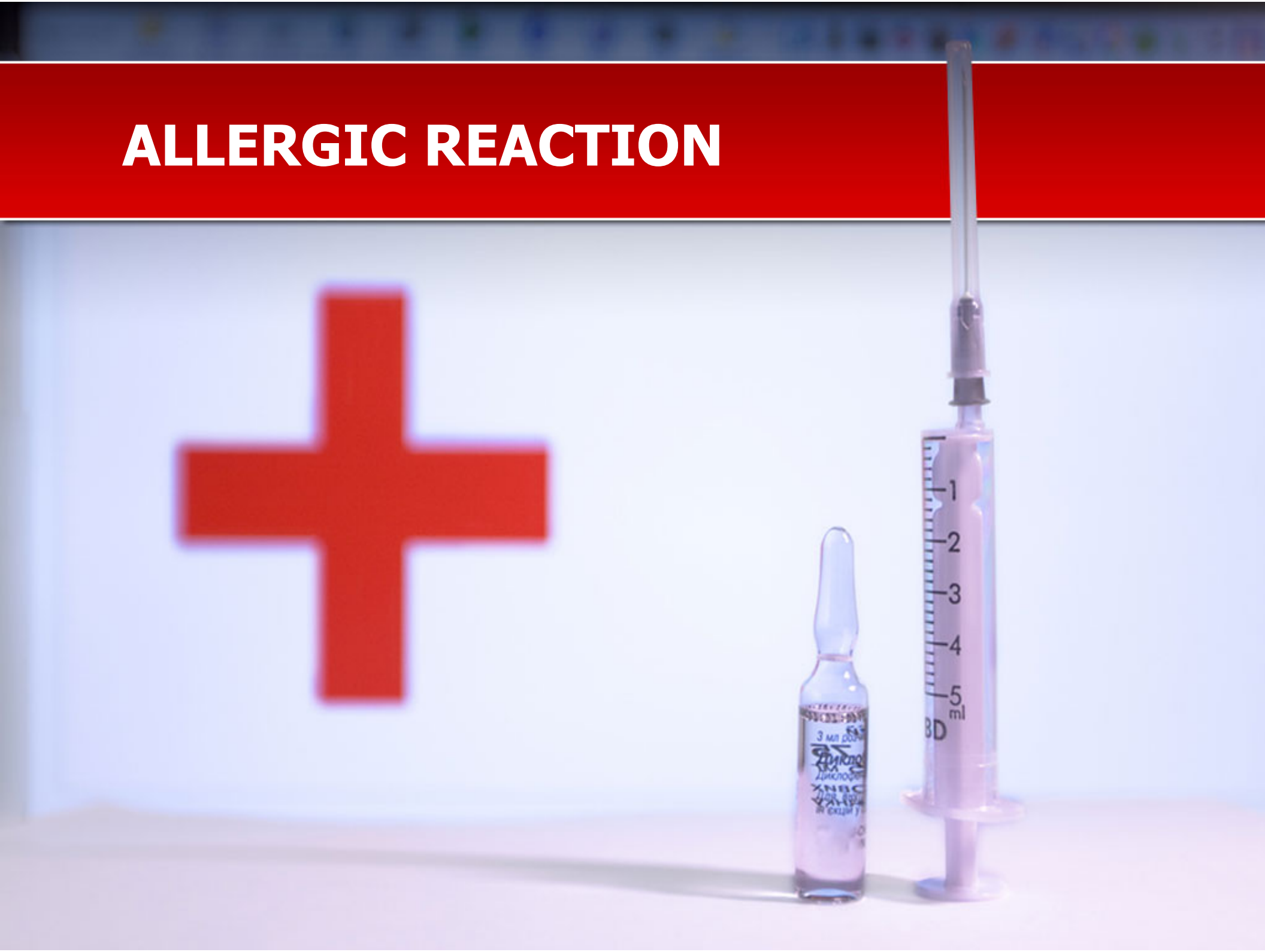
a. **ACTIVATE EMS, Call 911**

b. **ADMINISTER** EPINEPHRINE:



a. Auto-Injector - 1:1000 (1mg/ml) 0.5mg IM may repeat 3-5minutes

ALLERGIC REACTION



ALLERGIC REACTION

- DEFINITION: Anaphylaxis and Anaphylactoid reactions are immediate hypersensitivity reactions involving a generalized response to a specific antigen (Degranulation of mast cells and basophils, with release of histamine, leukotrienes and prostaglandins).

ALLERGIC REACTION

- Anaphylaxis: involves antigen and IgE antibodies. Requires previous sensitization/exposure to an antigen.
- Anaphylactoid Reaction: mediated by histamine and may occur with first exposure to an antigen.

ALLERGIC REACTION

CAUSES:

- Local anesthetics or preservatives
- Antibiotics, especially I.M. or I.V.
- Any drug used in dental setting (i.e. barbiturate, narcotic)
- Venom of stinging insects

ALLERGIC REACTION

PREVENTION:

- MEDICAL HISTORY (include specific questions on allergies).
- Use large, visible label on the inside of allergic patient's chart.
- Perform skin or other tests for specific drug allergies (these tests considered questionable by some).

ALLERGIC REACTION

PREVENTION: (cont.)

- Don't use drugs or other agents that are chemically similar to those to which the patient is allergic (i.e. PCN or Cephalosporins)
- Use oral administration instead of injection of potential allergens (i.e. penicillin)

ALLERGIC REACTION

SYMPTOMS:

- Pallor
- Rash
- Itching
- Urticaria (hives)
- Angio-edema
- Hypotension
- Dyspnea
- G.I. Upset
- Coma
- Bronchial Constriction
- Laryngo-edema

ALLERGIC REACTION

TREATMENT:

- **STOP**
- **CALL** for HELP (Emergency Kit/Oxygen/AED).
- **POSITION** patient comfortably.
- **OXYGEN** 100%.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- **If symptoms <u>Mild</u>** (itching/rash):
  - **ADMINISTER** Diphenhydramine 50mg PO.
- **If symptoms progress to Moderate (Bronchospasm/Wheeze):**
- **POSITION** - **UPRIGHT**.
- **ADMINISTER**
  a. **GIVE** 4-8 puffs ALBUTEROL MDI
  b. **EPINEPHRINE (1:1000)** 0.5mg Epi-Pen or 0.5mg IM, may repeat at 2-3 minutes up to 3 doses.







ALLERGIC REACTION

TREATMENT:

- **If SEVERE** (rash/hives/difficulty breathing/facial swelling):

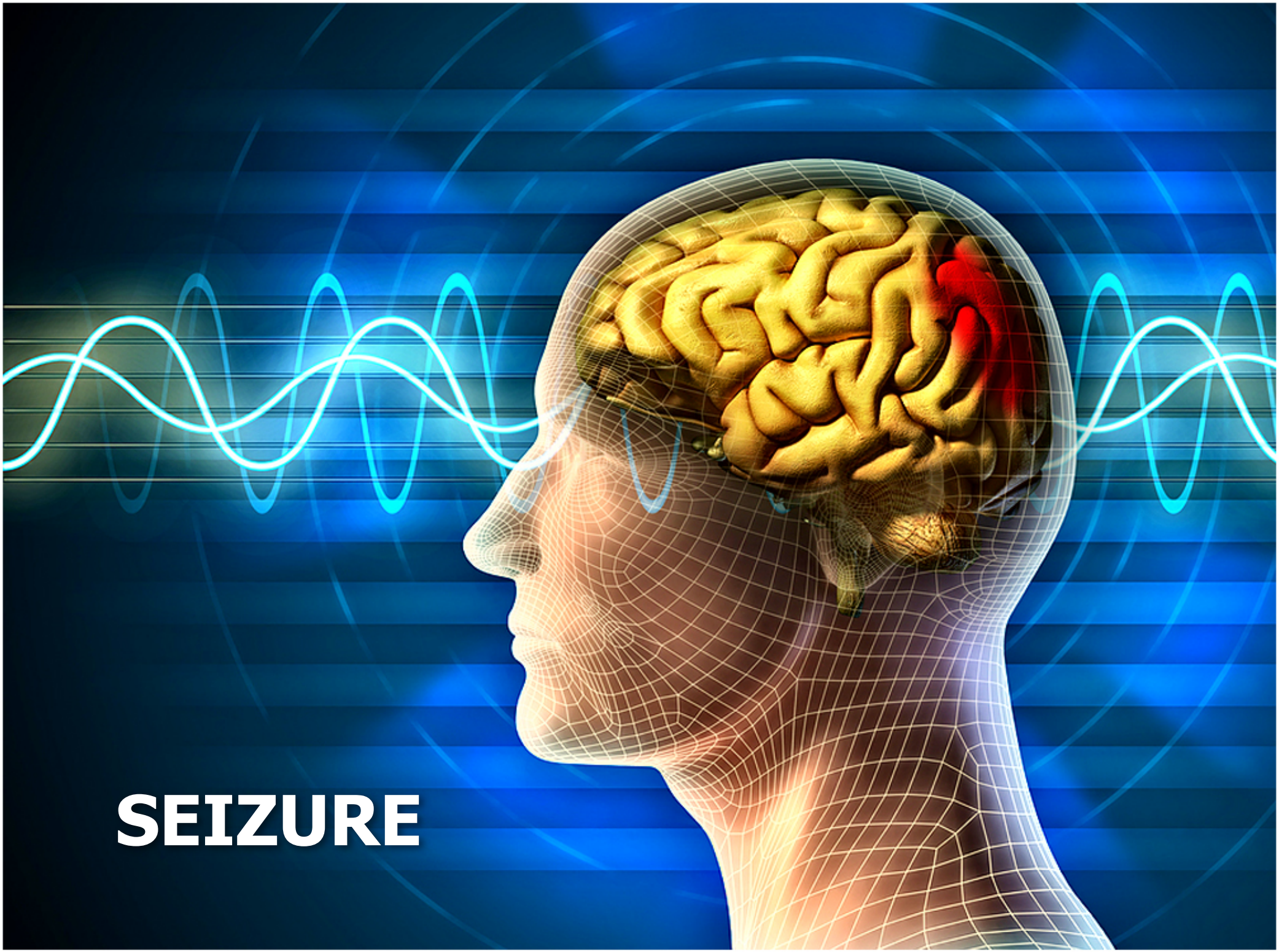
  - IMMEDIATELY **ACTIVATE EMS, Call 911.**

  a. **ADMINISTER** - EPINEPHRINE (1:1000) 0.5mg Epi-Pen or 0.5mg IM, may repeat at 2-3 minutes up to 3 doses.

  b. **ADMINISTER** - SOLUMEDROL (methylpredniolone) 125mg IM

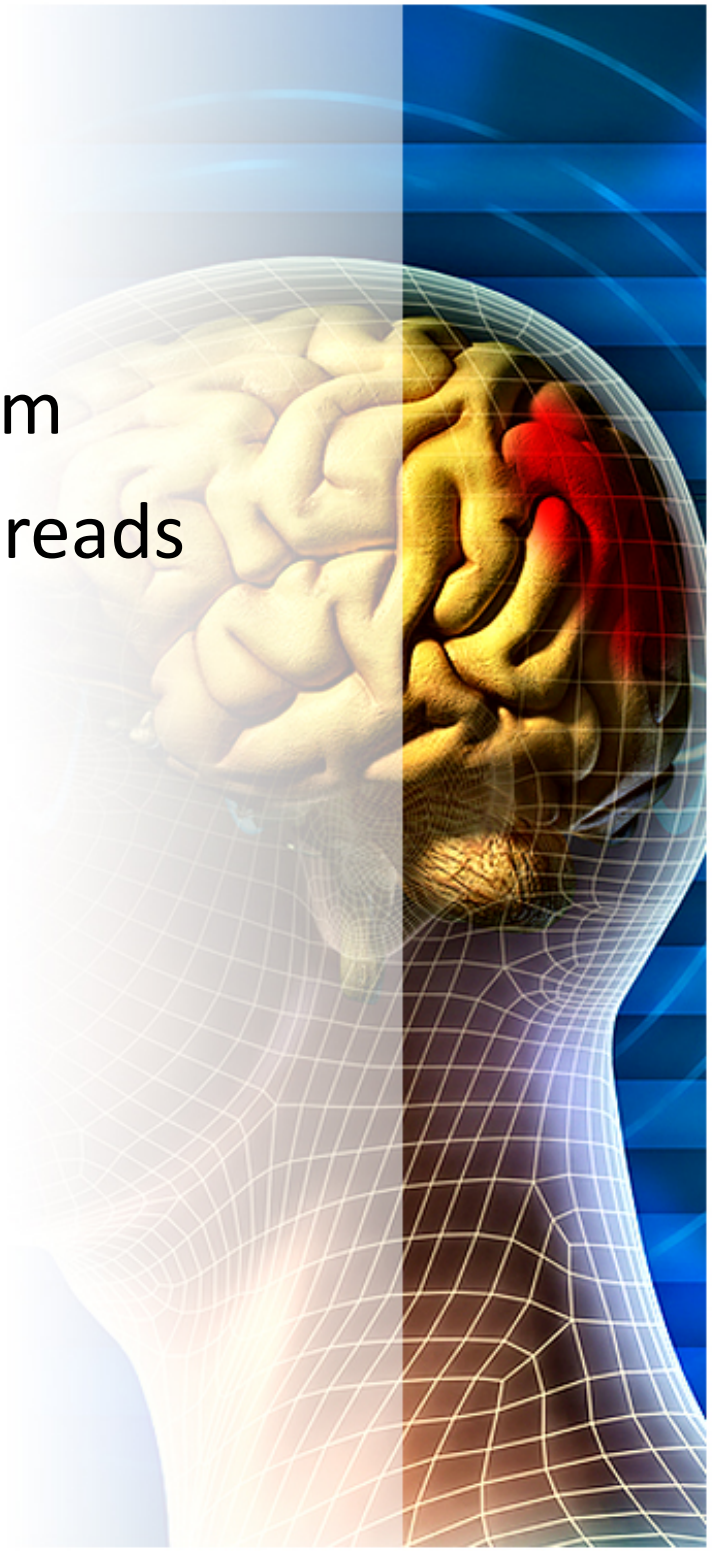
  c. **IF ADVANCE AIRWAY TRAINED** - INTUBATE Immediately




SEIZURE

SEIZURE

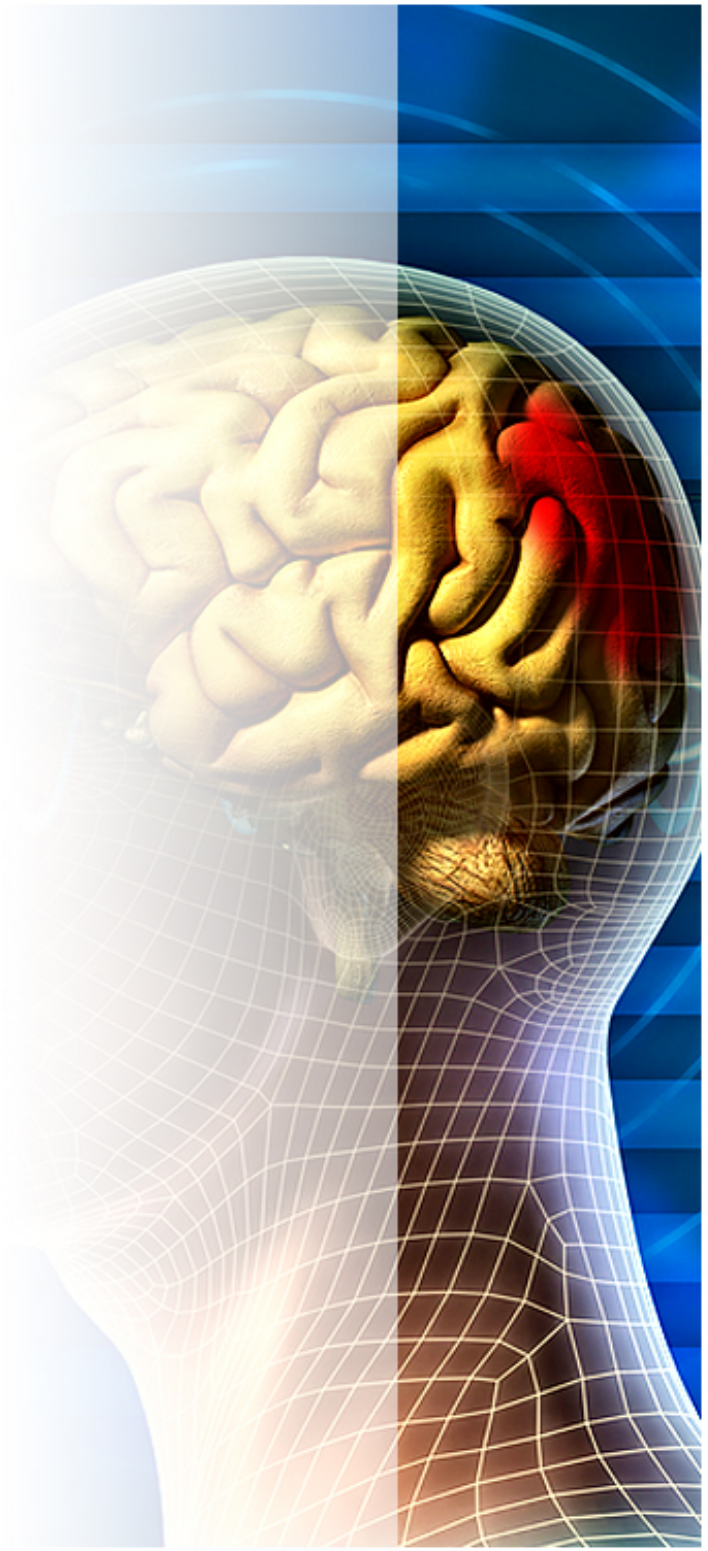
DEFINITION: convulsions resulting from excessive neuronal discharge which spreads throughout the brain



SEIZURE

CAUSES:

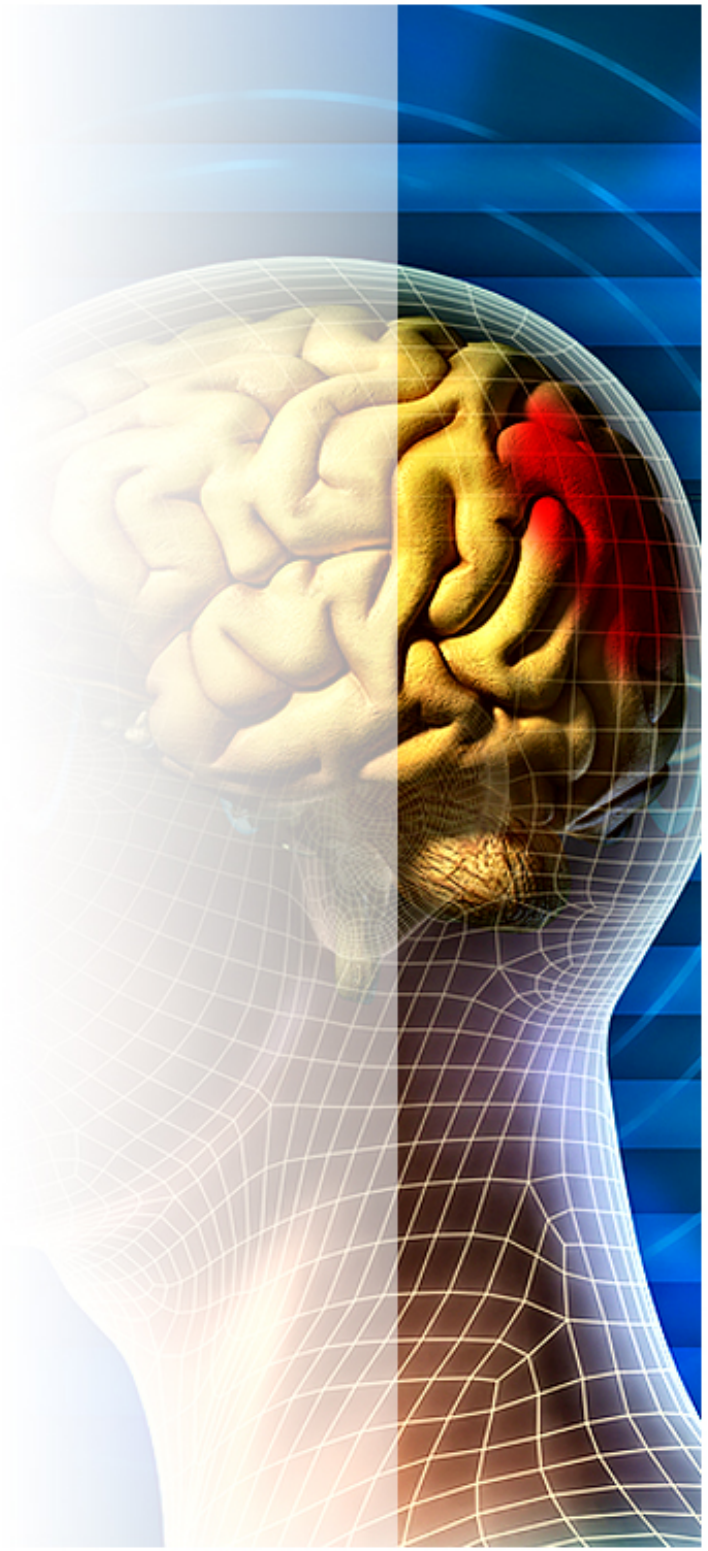
- Spontaneously occurring (i.e. Epilepsy)
- Toxic effect of medications on the CNS (i.e. Lidocaine)
- Metabolic disorders (i.e. hypoglycemia)



SEIZURE

PREVENTION:

- MEDICAL HISTORY
- STRESS REDUCTION PROTOCOL



SEIZURE



TREATMENT:

- **STOP**
- **ACT** - Call for HELP/Emergency Kit/Oxygen/AED.
- **POSITION** SUPINE and protect head/extremities.
- **ADMINISTER** 100% OXYGEN.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.



****ADVANCED TREATMENT****

<u>If SEIZURE CONTINUES (Status Epileptics) or REOCCURS</u>: - -

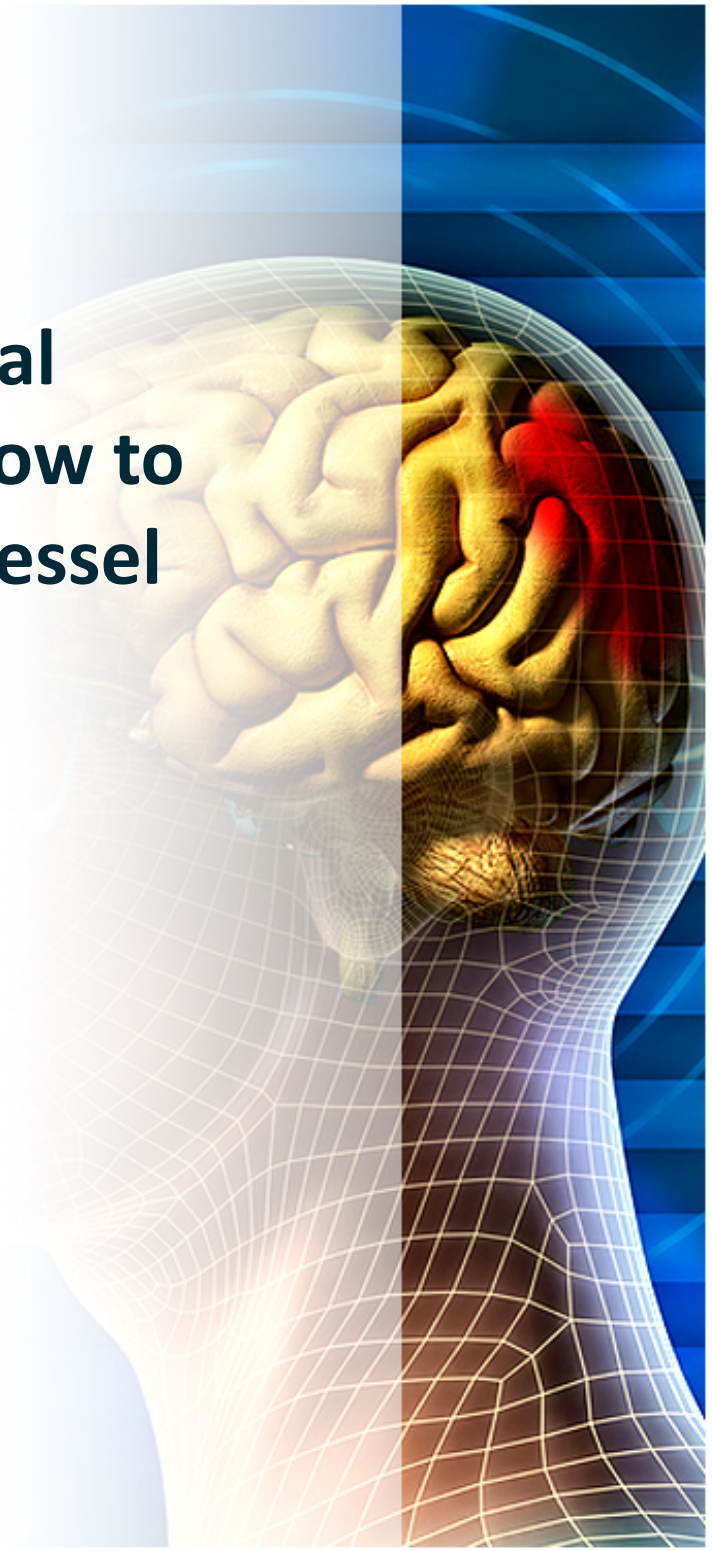
-IMMEDIATELY **ACTIVATE EMS - Call 911.**

-**ASSIST RESPIRATIONS**

-ADMINISTER Versed 2mg IM, may repeat.

STROKE

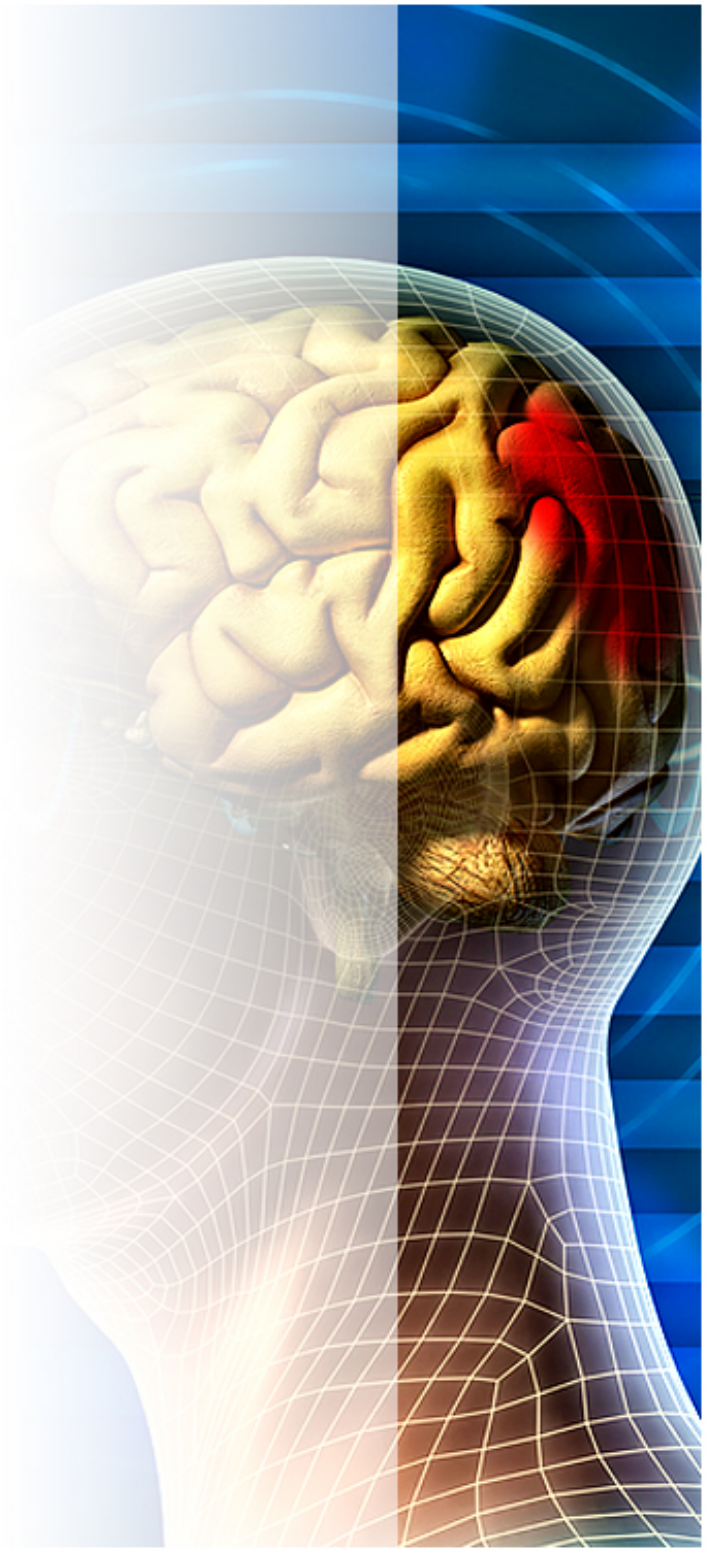
DEFINITION: A stroke is a serious medical emergency that happens when blood flow to part of the brain is blocked or a blood vessel in the brain bursts.



STROKE

PREVENTION:

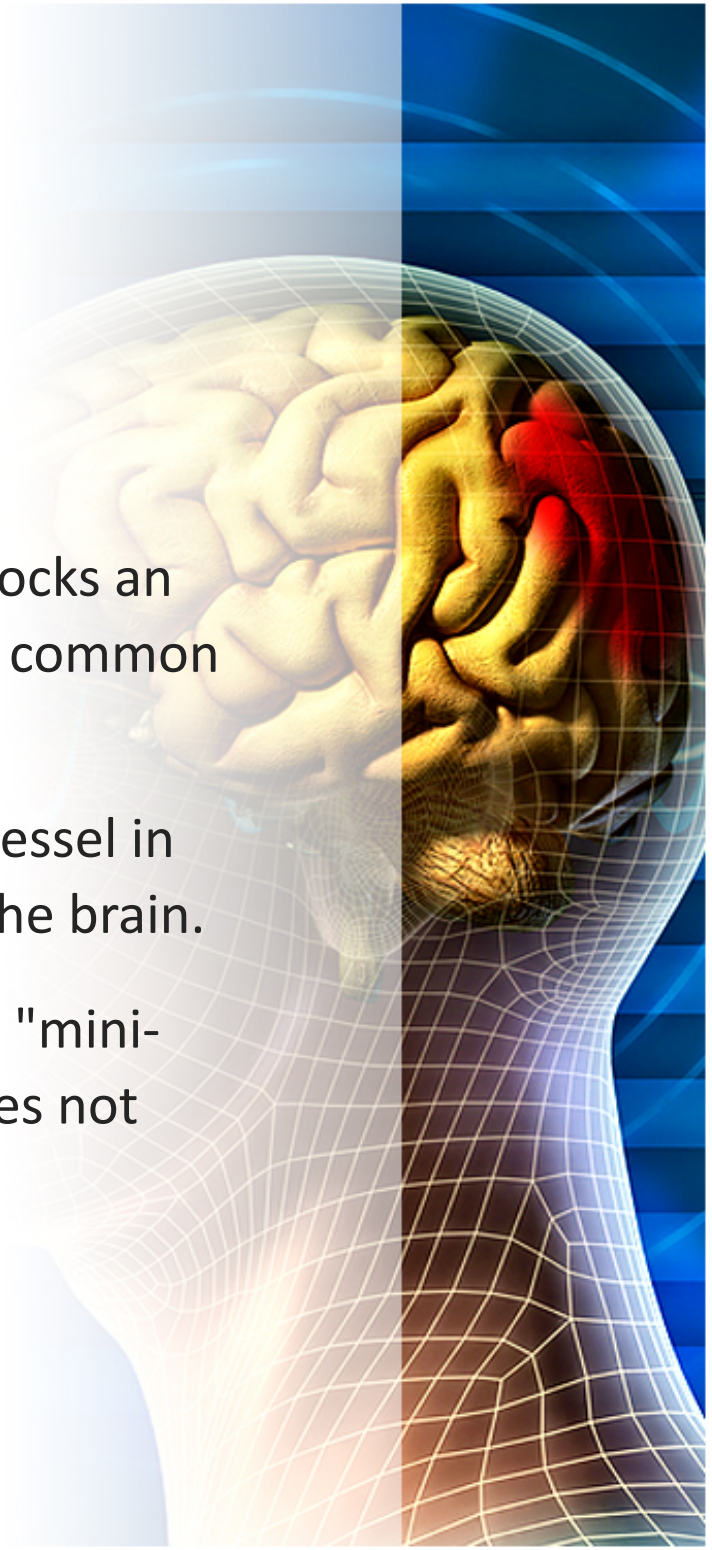
- Medical History
- Stress reduction
- Limited epinephrine
- Continuous Monitoring
- Avoid abrupt positional changes



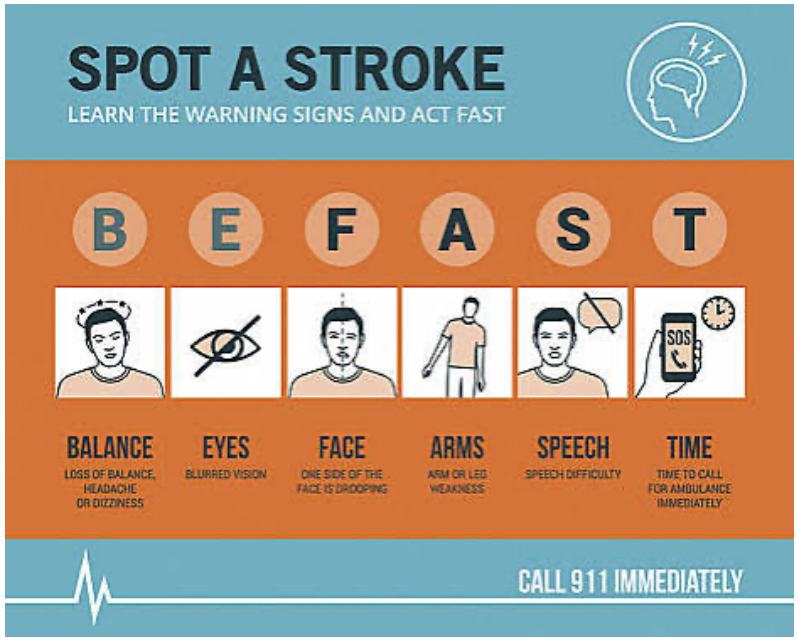
STROKE

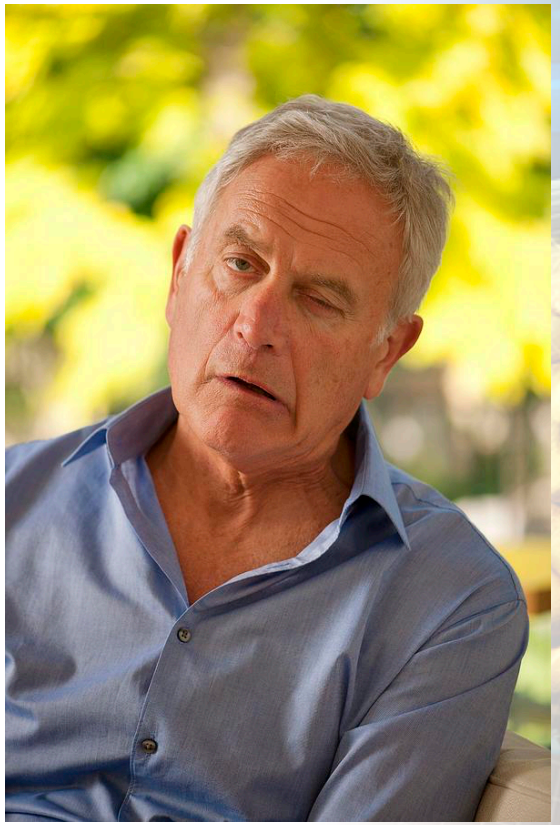
CAUSES:

- **Ischemic stroke:** This occurs when a blood clot blocks an artery that supplies blood to the brain. It is the most common type.
- **Hemorrhagic stroke:** This occurs when a blood vessel in the brain leaks or ruptures, causing bleeding inside the brain.
- **Transient ischemic attack (TIA):** Often called a "mini-stroke," this is a brief blockage of blood flow that does not cause permanent damage.



STROKE



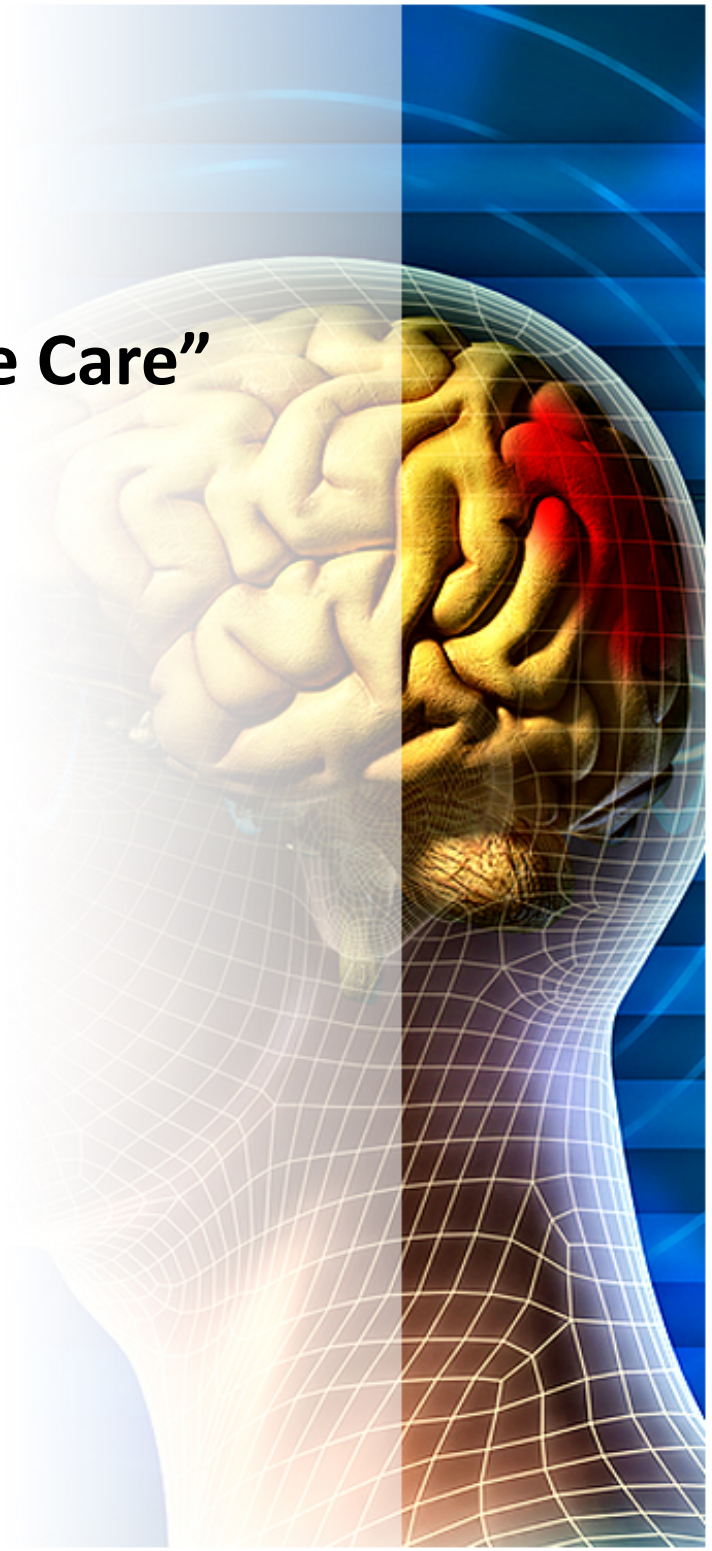


- **B**alance - sudden loss of balance /coordination.
- **E**yes - sudden vision change.
- **F**ace - facial drooping.
- **A**rm - arm drift/weakness.
- **S**peech - slurred.
- **T**ime - note exact time of symptoms

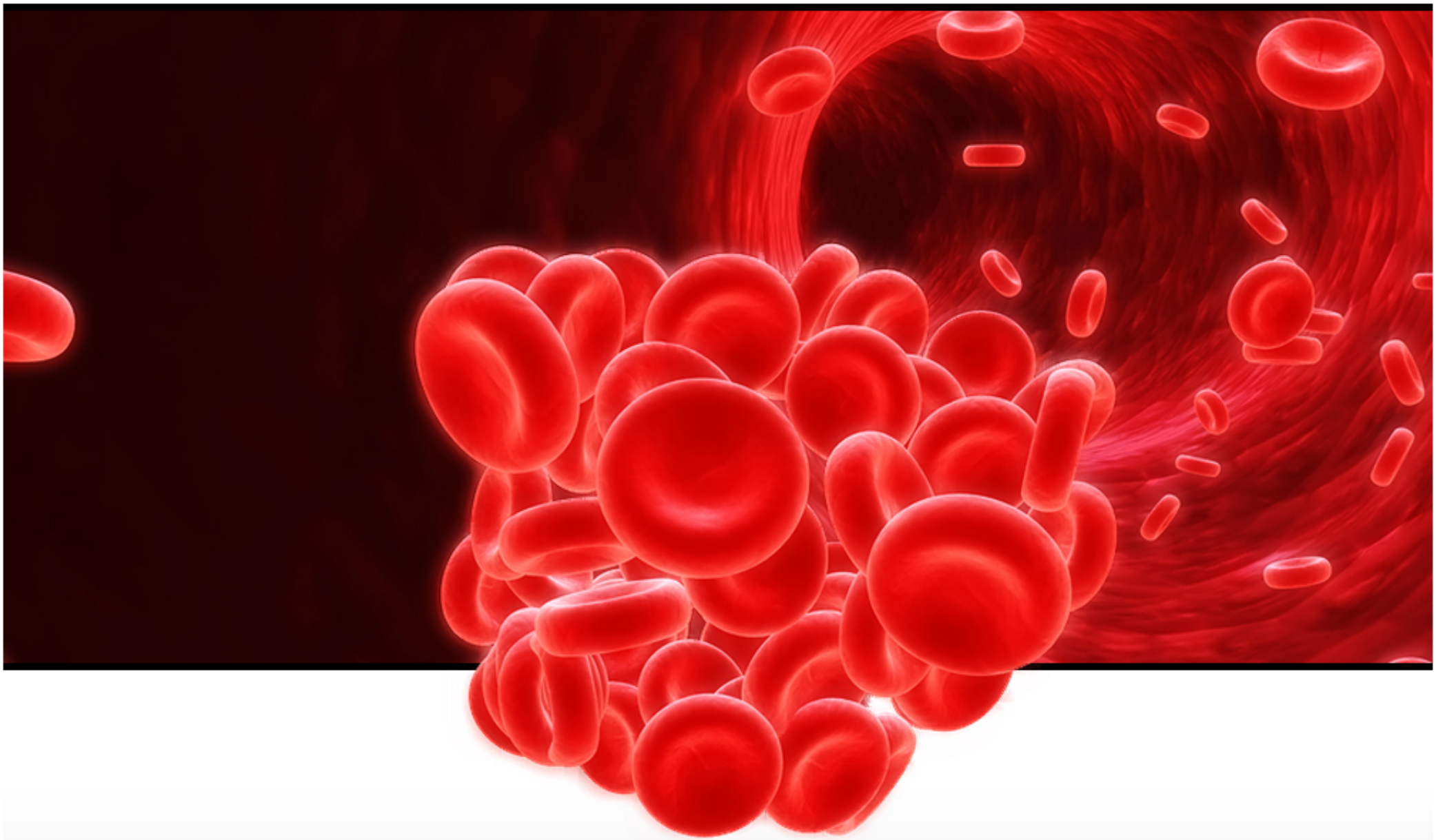
STROKE

TREATMENT: “Recognition and Supportive Care”

- **STOP**
- **IMMEDIATELY ACTIVATE EMS, Call 911.**
- **ACT** - Call for HELP/Emergency Kit/Oxygen/AED.
- **NOTE & RECORD** Onset of Symptoms.
- **POSITION** Semi-reclined.
- **ADMINISTER** 100% OXYGEN.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- **NPO** - Give nothing to eat or drink



Angina



Angina

DEFINITION:

- Sub-Sternal pain varying from mild to severe. Pain often radiates to left shoulder, arm and jaw.
- Can be precipitated by exertion, anger, **EMOTIONAL STRESS**, or **FEAR**.
- Usually lasts less than 15 minutes.

Angina

CAUSE:

- temporary **insufficient** supply of oxygen (ischemia) to the heart muscle due to narrowing of the coronary arteries and/or demand for increased cardiac output

Angina

PREVENTION:

- **MEDICAL HISTORY**
- **STRESS REDUCTION PROTOCOL**
- Consider pre-treatment with **NITROGLYCERIN** 1-2 tablet SL.
- Monitor Vitals [HR, blood pressure, SPO2].
- Use effective local analgesia. Beware of maximum local anesthesia dosage with or without epinephrine.

Angina

SYMPTOMS:

- **Chest Pain** often described as a sensation of squeezing, burning, pressing, choking, aching, bursting, tightness, or “gas".

Angina

TREATMENT:



- **STOP**
- **ACT** - **CALL** for Help/Emergency Kit/Oxygen/AED.
- **POSITION COMFORTABLY** or Semi-Supine.
- Administer **100% OXYGEN 10 - 15 mL/min** via Non-Rebreather facemask **.**
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- **ADMINISTER NITROGLYCERIN** 1-2 tablets SL q3min. (May repeat for 3 doses).

Angina

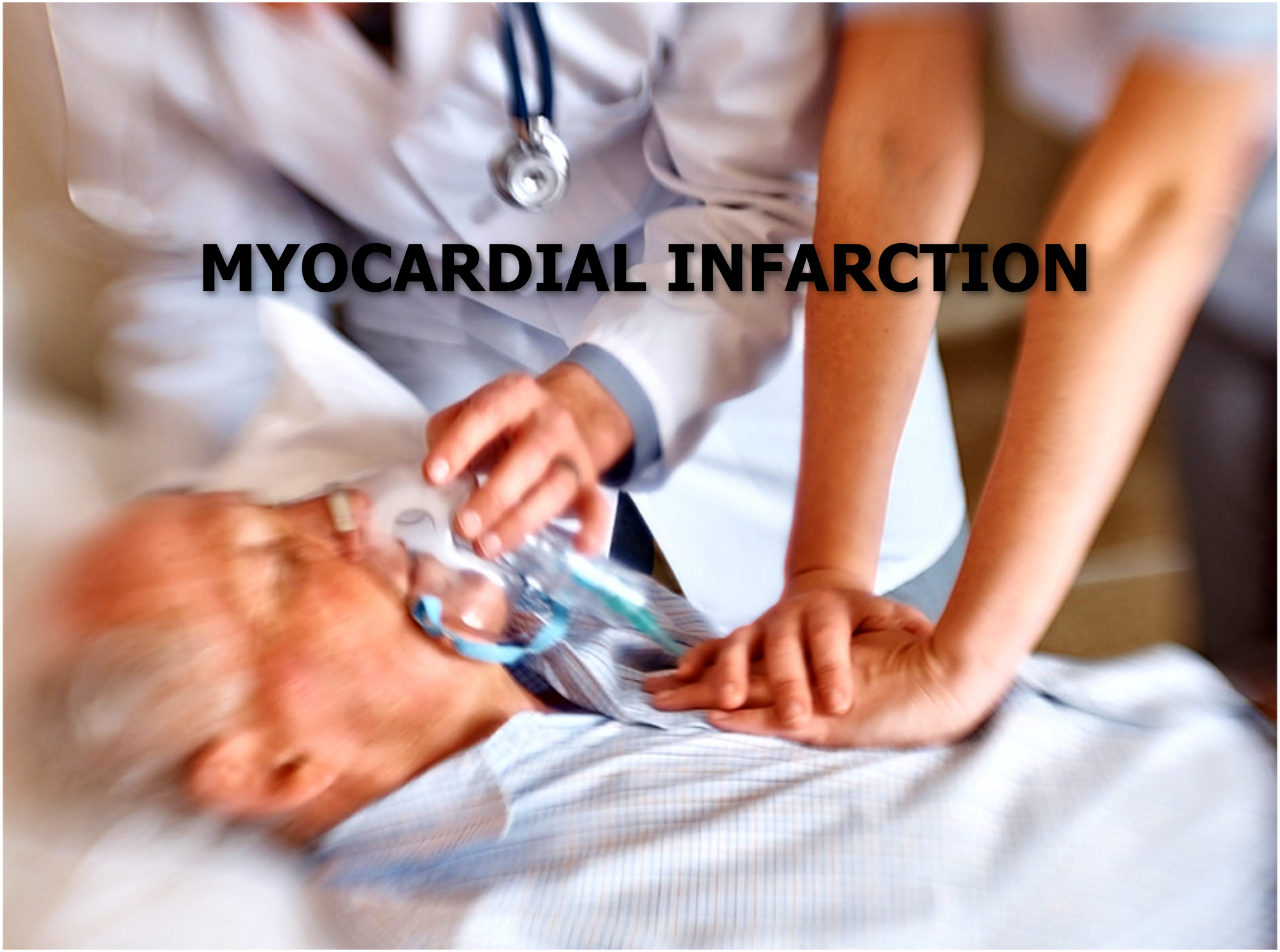
TREATMENT:

NOTE: Patients that have taken a phosphodiester inhibitor medication such as Viagra or Cialis within the last 48 hours <u>should not</u> be given nitroglycerin.

- If **<u>NO RESPONSE</u>, pain intensifies, or different duration and/or character** then follow **<u>Myocardial Infarction Protocol</u>** because…..

"IT IS A HEART ATTACK"

ACTIVATE EMS, CAll 911


MYOCARDIAL INFARCTION

Myocardial Infarct

DEFINITION:

- deficient coronary arterial blood supply to region of the myocardium resulting in cellular death and necrosis.



Myocardial Infarct

CAUSES:

- Stress
- Blood vessel disease
- Thrombosis



Myocardial Infarct

PREVENTION:

- **MEDICAL HISTORY**
  - M.I. less than 6 months prior to treatment indicates ASA Class IV (no elective treatment).
- **STRESS REDUCTION PROTOCOL**
- **Position** semi-supine
- **Aspirate** and give local anesthetics slowly if necessary
- **AVOID 1/50,000 EPINEPHRINE**
- Limit total dose of epinephrine to less than 0.04mg



Myocardial Infarct

SYMPTOMS:

- SEVERE pain of Anginal type:
  - sudden onset
  - radiating (left arm, lower jaw)
  - crushing pressure
- Pain not relieved with nitroglycerin
- Cold sweat, apprehension, fear of impending doom
- Light-headedness, fainting, nausea, vomiting.
- Unconsciousness/Unresponsiveness



Myocardial Infarct

TREATMENT:

- **STOP**
- **ACT** - **CALL** for HELP/Emergency Kit/Oxygen/AED.
- IMMEDIATELY **ACTIVATE EMS,** Call 911.
- **<u>If Conscious</u>**, **POSITION COMFORTABLY**.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- **ADMINISTER 100% OXYGEN 10 - 15 mL/min Non-Rebreather Facemask.**
- **THINK "MONA"** (morphine/oxygen/nitroglycerine/aspirin**.**
- **Chew & Swallow 160-325mg ASPIRIN PO.**
- **ADMINISTER NITROGLYCERIN** 1-2tabs SL.



Myocardial Infarct

TREATMENT:

NOTE: Patients that have taken a phosphodiester inhibitor medication such as Viagra or Cialis within the last 48 hours should not be given nitroglycerin.

- **ANTICIPATE** CardioPulmonary Arrest (NO Pulse, NO Breathing).
- Continually **ASSESS / REASSESS**
- If CardioPulmonary Arrest, Immediately perform Professional Healthcare **CPR** or **ADVANCED CARDIAC LIFE SUPPORT**.



COMPLICATIONS ASSOCIATED with SEDATION

- **Hypoventilation** from airway obstruction or respiratory depression causes **hypoxia** and **hypercapnia**.
- Cardiovascular depression results in **hypotension**.
- **Drug overdose** can lead to hypoventilation or adverse drug reactions can cause an **anaphylaxis** or **anaphylactoid** reactions.
- **Aspiration** associated with loss of protective airway reflexes.
- **Nausea** and **vomiting**.
- **Equipment failure, loss of situational awareness, and human error.**



COMPLICATIONS ASSOCIATED with SEDATION

Airway Obstruction

- Airway obstruction is the most common complication associated with any type of Sedation (Oral, IV Conscious, or General Anesthesia).
- Airway obstruction is the result of loss of muscle tone of the submandibular muscles, tongue and epiglottis.



COMPLICATIONS ASSOCIATED with SEDATION

Airway Obstruction

Factors associated with difficult airway management:

- Previous problems with sedation and anesthesia.
- Stridor, snoring and/or sleep apnea.
- Craniofacial abnormalities [i.e. Pierre-Robin Syndrome, Trisomy 21].
- Advanced rheumatoid arthritis
- Obesity
- Airway Evaluation showing small mouth, large tongue, short neck, protruding incisors, facial hair, edentulous, and/or short chin



COMPLICATIONS ASSOCIATED with SEDATION

Airway Obstruction

Signs of Airway Obstruction:

- Inspiratory stridor
- Snoring
- Sternal retractions
- Rocking chest movements
- Absence of breath sounds
- Hypoxemia
- Hypercapnea



COMPLICATIONS ASSOCIATED with SEDATION

Hypoxemia

Hypoxemia is present when PaO2 is less than 60mmHg or the SpO2 is less than 90%.

Causes of Hypoxemia:

- Hypoventilation
- Low inspired oxygen
- Increased oxygen consumption from shivering, sepsis, or pain
- Low cardiac output



COMPLICATIONS ASSOCIATED with SEDATION

Treatment of Hypoxemia

- Oxygenate and Ventilate
- If Airway Obstruction:
  - Reposition Head - Chin Lift, Jaw Thrust
  - Use airway adjunct - oral airway, nasal airway, LMA, iGel, Oral Tracheal Tube
- If Over-Sedation: Administer reversal agents
  - Naloxone - (Adult dose) 0.4 - 2mg IV/IM/IN (Pediatric dose) 0.01mg/kg IV/IM/IN
  - Flumanzenil - (Adult dose) 0.2mg IV/IM/IN (Pediatric dose) 0.01 - 0.02mg/kg IV/IM/IN



COMPLICATIONS ASSOCIATED with SEDATION

Hypercapnea

Hypercapnea refers to the buildup of Carbon Dioxide in the blood stream. The usual cause of hypercapnea is respiratory depression caused by the administration of;

- Sedatives - Benzodiazepines, Barbituates, Zolpidem (Ambien), Zaleplon (Sonata), Eszopiclone (Lunesta)
- Hypnotics - Propofol
- Narcotics - Morphine, Demerol, Fentanyl, Alfentanil, Remifentanil



COMPLICATIONS ASSOCIATED with SEDATION

Hypercapnea

Acute Hypercapnea is a life threatening emergency causing;

- Cardiac dysrhythmia - premature atrial contractions.
- Respiratory Acidosis leading to organ failure and life threatening coagulopathies.
- Seizures
- Coma
- Death



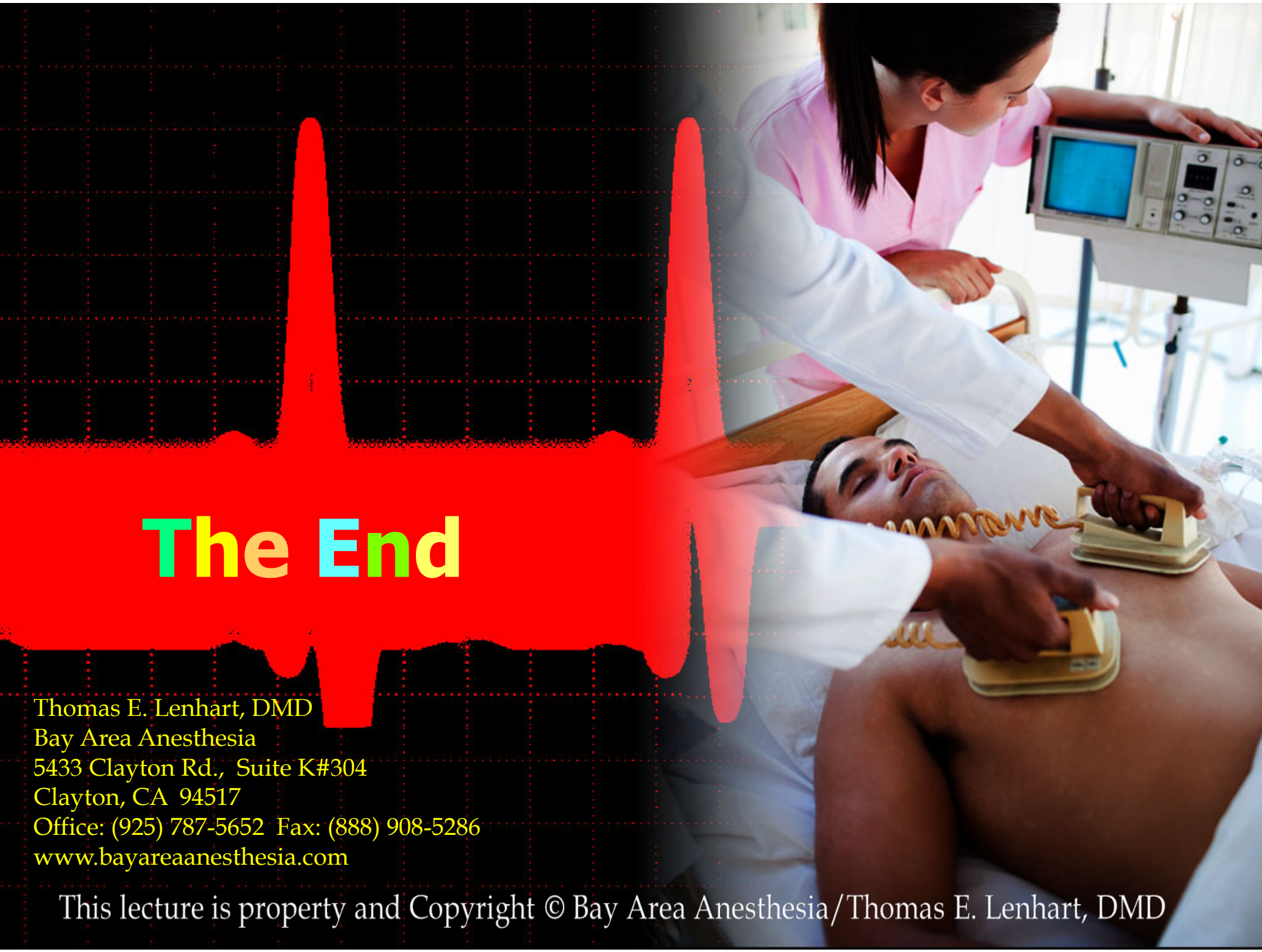
COMPLICATIONS ASSOCIATED with SEDATION

Hypercapnea

Hypoventilation resulting in “Hypercapnea” is difficult to detect when supplemental oxygen is being administered.

- ***Ventilation*** and ***Oxygenation*** are separate processes thus the monitoring of oxygenation with a pulse oximeter ***<u>does not</u>*** measure the adequacy of ventilations.
- Capnography allows for the measurement of CO2 - adequacy of ventilations.





The End

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