Preparation and Management of Medical Emergencies in the Dental Office

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Co-Director, High Fidelity Human Simulation Course-American Dental Society of Anesthesiology
Co-Creator, Ten Minutes Saves a Life! Emergency Application and Manual

Disclosers

- Board of Directors, American Dental Society of Anesthesiology (ADSA)
- Co-Chair/Developer, Ten Minutes Saves a Life! Emergency Manual and Application
- Receive no reimbursement for either position

Medical Emergencies

Part I and II

- Part I: Office preparation
- Part II: Common medical emergencies in the dental office

How Much Does a Dentist Need to Know?

- Keep the patient alive by treating them until recovery or until another more qualified individual assumes responsibility for treatment

Patient I

1.9 On May 1, 2018, Patient I presented to Respondent for a dental procedure including placement of dental implants at the site of teeth #27 and #30. Respondent obtained vital signs and administered oral arnica and local anesthesia before beginning the procedure. Additional local anesthesia was administered in the course of the procedure.

1.10 Prior to implant placement, Patient I became agitated and began moving. Witness reports described Patient I as appearing to be struggling to breathe. Respondent directed office staff to call for emergency assistance and bring an office emergency kit. Respondent noted Patient I's tongue was swollen and held the tongue down while simultaneously performing a jaw thrust maneuver.

1.11 Upon delivery of the emergency kit, an assistant removed the drape from Patient I. Patient I's skin was noted to be blue in appearance. An assistant administered chest compressions to Patient I at the direction of another dentist who was speaking with the 911 operator; the 911 operator also recommended Patient I be transferred to the floor from the dental chair. Oxygen administration was started utilizing a nasal hood.

1.12 Respondent instructed staff that Patient I had a pulse and that no cardiopulmonary resuscitation (CPR) was needed. No rescue breathing was attempted.

1.13 Emergency personnel arrived and found that Patient I was still positioned in the dental chair and CPR was not in progress. Emergency personnel noted respiration was minimal and Patient I's shirt was cut off exposing the presence of a skin rash. Patient I was treated for suspected anaphylaxis with epinephrine and Benadryl. Patient I required respiratory support with an Ambu bag and intubation.

1.14 Patient I was transported to the hospital and admitted. Upon admission, Patient I was diagnosed with hypoxic brain injury.

1.15 Respondent's treatment of Patient I failed to meet the standard of care of a reasonably competent dentist in the state of Washington in the following ways:

A. Respondent failed to competently administer CPR as Patient I remained in the dental chair during chest compressions.

B. Respondent failed to competently administer rescue breathing based only on the presence of a pulse.

C. Respondent used an inadequate method of oxygen delivery.

D. Respondent failed to identify Patient I's swollen tongue and respiratory distress as possible signs of anaphylaxis. Respondent failed to perform appropriate emergency responses to Patient I's distress such as administration of epinephrine and CPR.

E. Respondent failed to adequately inform emergency personnel of observations made during the event including Patient I's swollen tongue and the sequence of signs and treatments attempted. Respondent failed to adequately inform emergency personnel of all medications and substances administered to Patient I.

F. Respondent failed to store or position the emergency kit and oxygen tanks in a location readily accessible to the dental care team in the event of a medical emergency.

G. Respondent failed to maintain a written emergency response protocol for use in the event of a medical emergency.

H. Respondent's record keeping for Patient I was deficient in the following ways: Respondent lacked consent forms for the dental procedure undertaken and the clinical record lacked notation of any soft tissue/pathology examination, head and neck examination, respiratory rate, height, and weight.

1.16 On May 11, 2018, approximately ten (10) days after the occurrence of Patient I's life-threatening incident, Respondent reported the occurrence to the Dental Quality Assurance Commission.

Part I

Office Preparation for Medical Emergencies

https://public.govdelivery.com/accounts/WALEG/subscriber/new

Guidelines

Structure

- Most states will arrange guidelines based on anesthetic agents and/or levels of sedation
  - **Local anesthesia**
  - **Nitrous oxide**
  - **Minimal sedation**
  - Moderate sedation
  - Parenteral moderate sedation
  - Deep sedation/general anesthesia

Washington State Law

WAC 246-817-724

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

Office facilities and equipment must include:

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

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

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

(d) Stethoscope or equivalent monitoring device.

General Guidelines

Emergency drugs

- Emergency drugs including, but not limited to:
  - Anti-anaphylactic agent (i.e., epinephrine)
  - Antihistamine (i.e., diphenhydramine)
  - Anti-platelet (i.e., aspirin)
  - Bronchodilator (i.e., albuterol inhaler)
  - Coronary artery vasodilator (i.e., nitroglycerin)
  - Sugar (i.e., glucose)
  - Pharmacologic antagonists appropriate to the drugs used (i.e., flumazenil if using a benzodiazepine)

Medication	#	Used For	Typical Dose	Syringe	Notes
Albuterol (inhaler) 90 mcg/puff	1	Bronchospasm	1-3 puffs	None	Shake and prime
Glucose	2	Hypoglycemia	Titrated to effect	None	Juice, non-diet soda, glucose gel or tablets
Aspirin 325 mg/tab; 1 bottle	1	Myocardial infarction	325 mg (1 tab chewed)	None	Must be nonenteric coated tablets; can also use 4 dissolvable tablets (81 mg)
Diphenhydramine 50 mg/mL; 1 mL	2	Allergic reaction	50 mg IM (1 mL)	1 mL	Can be given IV
Oxygen Portable 'E' size cylinder tank (~700 Liters)	1	Almost all emergencies	0.5-10 L/min	None	Must have regulator and key; BVM with multiple size face masks; full face mask or nasal cannula
Nitroglycerin 0.4 mg/tab (25/bottle)	1	Angina	0.4 mg (1 tab)	None	Can use a spray or tablets
Epinephrine (1:1000); pre-loaded, self-injecting syringe	2	Allergic reaction, severe asthma/bronchospasm, bradycardia	0.3 mg IM (Adult)	Medication comes with syringe	Pediatric dose is 0.15 mg
Epinephrine (1:1000) 1 mg/mL; 1 mL	2	Allergic reaction, severe asthma/bronchospasm, bradycardia	0.3 mg IM (Adult) (0.3 mL)	1 mL	Can premark the 1 mL syringe so you know the proper dosage

Emergency Kit
Contents

- Medications/Syringes
- Monitoring equipment/AED
- Airway supplies
  - Portable oxygen tank with regulator and key
  - Bag-valve-mask with multiple mask sizes
- Flashlight/batteries
- Emergency record/Pens
- Manual of emergency protocols

Emergency Kit
Monitoring equipment

- Monitors
  - Blood Pressure/Pulse
  - Pulse Oximeter
- Stethoscope
- Glucometer
- Automated External Defibrillator

Emergency Kit

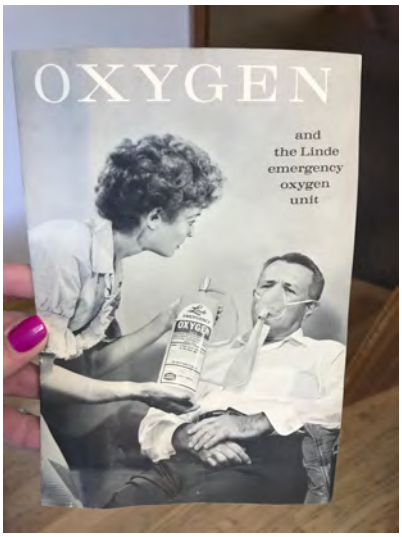
Glucometer

Normal Blood Sugar Range:
80 - 120 mg/dL

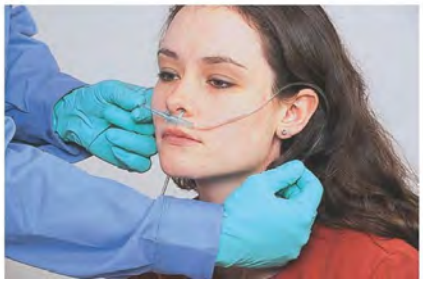
Emergency Kit:
Airway Supplies

Emergency Kit

Portable ‘E’ cylinder oxygen tank with regulator and key



Face Mask and Nasal Cannula



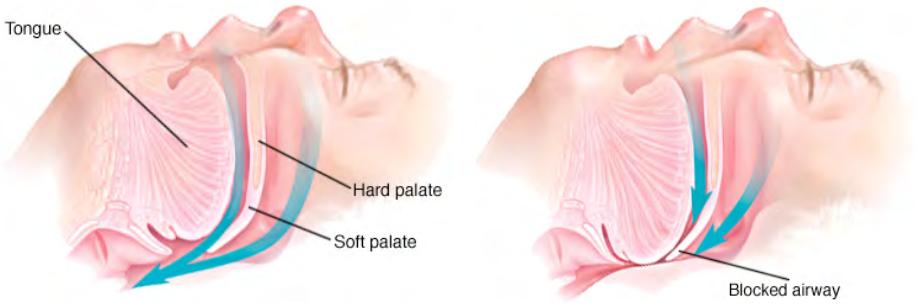
Emergency Kit

Bag-Valve-Mask (or Ambu® bag)

- Need multiple mask sizes

E-C clamp technique

Soft Tissue Obstruction

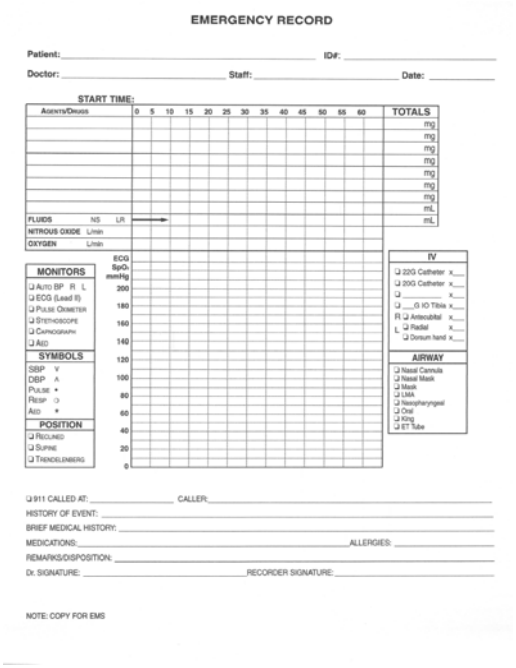


~~Demand Valve~~

- Forces oxygen into the lungs AND into the stomach (40 LPM)
- Cause gastric distention/vomiting
- Pressure limit is set at 60cm H_20
- Over pressurization of the lungs and barotrauma

Emergency Kit

Flashlight/Headlamp/Batteries



EMERGENCY RECORD

Patient: _____ ID#: _____

Doctor: _____ Staff: _____ Date: _____

START TIME:

Agents/Drugs	0 5 10 15 20 25 30 35 40 45 50 55 60	TOTALS
		mg
		mg
		mg
		mg
		mg
		mg
		mg
		mL
FLUIDS NS LR		mL
NITROUS OXIDE L/min		
OXYGEN L/min		

MONITORS
- ❑ Auto BP R L
- ❑ ECG (Lead II)
- ❑ Pulse Oximeter
- ❑ Stethoscope
- ❑ Capnograph
- ❑ Aed

SYMBOLS
- SBP X
- DBP A
- Pulse •
- Resp ○
- Aed +

POSITION
- ❑ Reclined
- ❑ Supine
- ❑ Trendelenberg

ECG
SpO2
mmHg
200 180 160 140 120 100 80 60 40 20 0

IV
- ❑ 22G Catheter x___
- ❑ 20G Catheter x___
- ❑ _____ x___
- ❑ ___G IO Tibia x___
- Rt ❑ Antecubital x___
- Lt ❑ Radial x___
- ❑ Dorsum hand x___

AIRWAY
- ❑ Nasal Cannula
- ❑ Nasal Mask
- ❑ Mask
- ❑ LMA
- ❑ Nasopharyngeal
- ❑ Oral
- ❑ King
- ❑ ET Tube

❑ 911 CALLED AT: _____ CALLER: _____

HISTORY OF EVENT: _____

BRIEF MEDICAL HISTORY: _____

MEDICATIONS: _____ ALLERGIES: _____

REMARKS/DISPOSITION: _____

Dr. SIGNATURE: _____ RECORDER SIGNATURE: _____

NOTE: COPY FOR EMS

Office Preparation

Manuals

1. Written Emergency Protocol (unique to your office)
2. Emergency Manual (crisis checklist)

Office Preparation

Written Emergency Protocol

- Location/contents of the emergency kit
- Emergency evacuation
- 911 protocols
  - Meet EMS at the door/hold the elevator
  - Have phone number and address next to all phones AND in all operatories
- Universal treatment emergency protocol known to all staff

Universal Treatment Algorithm

R - Recognition of Emergency
Call for assistance: retrieve O_2, AED, and emergency kit
Remove material from mouth

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

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

B - Breathing
Assess breathing
If breathing, O_2 as directed by pulse oximetry with 100% O_2 @ 10 L/min via facemask
If evidence of breathing difficulty or not breathing, call 911; positive pressure ventilation with BVM @ 10L/min 100% O_2

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

D - Diagnosis, Definitive Therapy

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

Office Preparation

Manual of Emergency Protocols

- A checklist you can use during an emergency to help the team be more involved, double check medication doses, and make sure you are doing everything you can before EMS arrives or the issue resolves
- Allows you to be more thoughtful about the crisis
- Many states now require this type of manual

Ten Minutes Saves A Life!

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

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

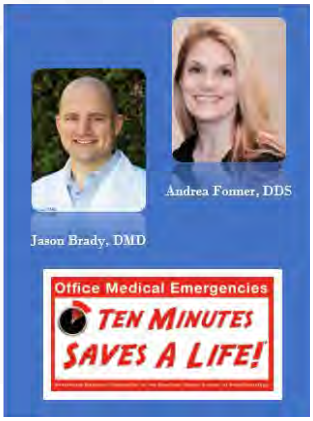
Practitioners should be familiar with the suggested emergency drugs/equipment and have them immediately available.

Available on the App Store

GET IT ON Google Play

Ten Minutes PDF

Ten Minutes - How To Video



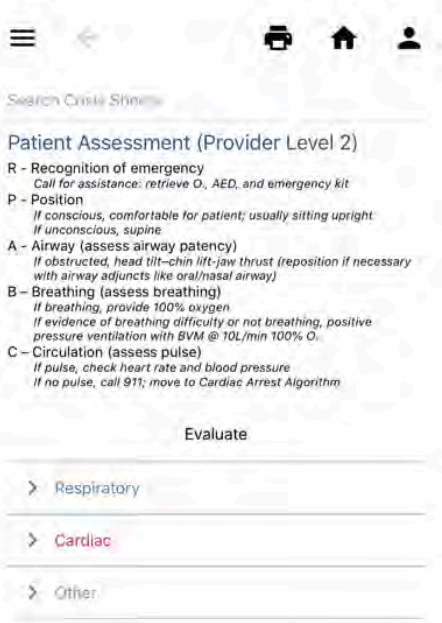
Ten Minutes Saves a Life!™
Anesthesia Research Foundation
Emergency Manual – Provider Categories®

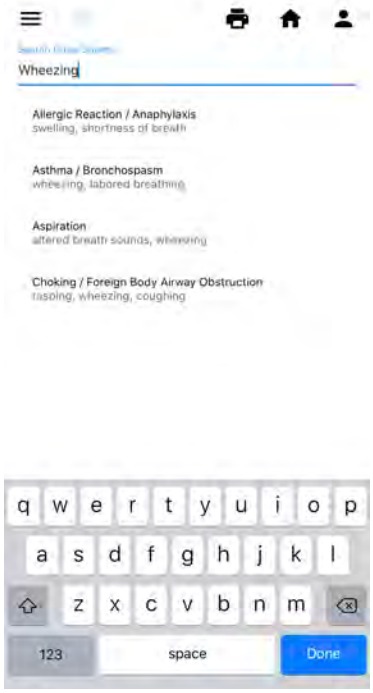
Provider Categories

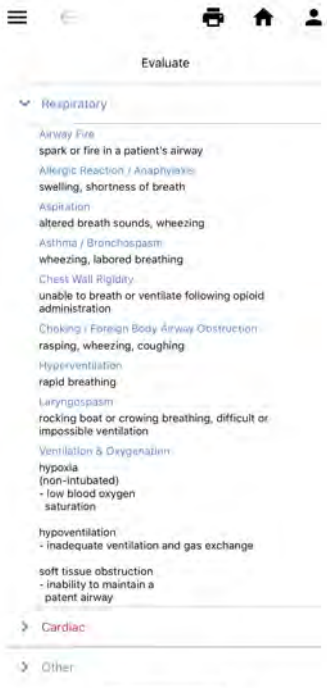
Level I:
General/specialty dentist using only local anesthesia or nitrous oxide/oral minimal/oral moderate sedation

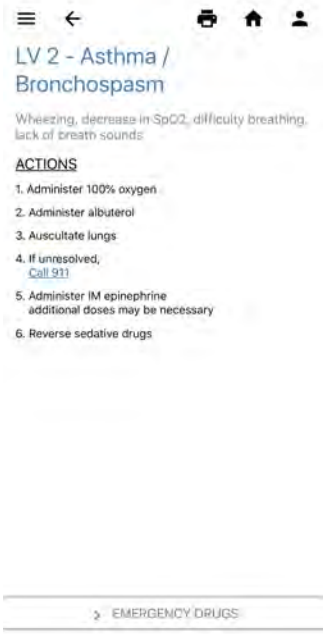
Level II:
General/specialty dentist can urgently initiate IV access but does not provide deep sedation/general anesthesia (provides IV moderate sedation routinely). Provider is current in BLS. May be current in ACLS and/or PALS.

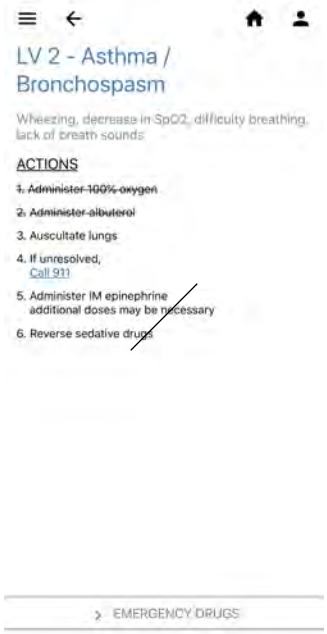
Level III:
Dentist providing deep sedation/general anesthesia. Provider is current in BLS and ACLS and/or PALS.


Search Crisis Shield
Patient Assessment (Provider Level 2)
R - Recognition of emergency
Call for assistance: retrieve O2, AED, and emergency kit
P - Position
If conscious, comfortable for patient; usually sitting upright
If unconscious, supine
A - Airway (assess airway patency)
If obstructed, head tilt–chin lift-jaw thrust (reposition if necessary with airway adjuncts like oral/nasal airway)
B – Breathing (assess breathing)
If breathing, provide 100% oxygen
If evidence of breathing difficulty or not breathing, positive pressure ventilation with BVM @ 10L/min 100% O2
C – Circulation (assess pulse)
If pulse, check heart rate and blood pressure
If no pulse, call 911; move to Cardiac Arrest Algorithm
Evaluate
Respiratory
Cardiac
Other


Wheezing
Allergic Reaction / Anaphylaxis
swelling, shortness of breath
Asthma / Bronchospasm
wheezing, labored breathing
Aspiration
altered breath sounds, wheezing
Choking / Foreign Body Airway Obstruction
rasping, wheezing, coughing
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
Done


Evaluate
Respiratory
Airway Fire
spark or fire in a patient's airway
Allergic Reaction / Anaphylaxis
swelling, shortness of breath
Aspiration
altered breath sounds, wheezing
Asthma / Bronchospasm
wheezing, labored breathing
Chest Wall Rigidity
unable to breath or ventilate following opioid administration
Choking / Foreign Body Airway Obstruction
rasping, wheezing, coughing
Hyperventilation
rapid breathing
Laryngospasm
rocking boat or crowing breathing, difficult or impossible ventilation
Ventilation & Oxygenation
hypoxia
(non-intubated)
- low blood oxygen saturation
hypoventilation
- inadequate ventilation and gas exchange
soft tissue obstruction
- inability to maintain a patent airway
Cardiac
Other


LV 2 - Asthma / Bronchospasm
Wheezing, decrease in SpO2, difficulty breathing, lack of breath sounds
ACTIONS
1. Administer 100% oxygen
2. Administer albuterol
3. Auscultate lungs
4. If unresolved,
Call 911
5. Administer IM epinephrine
additional doses may be necessary
6. Reverse sedative drugs
EMERGENCY DRUGS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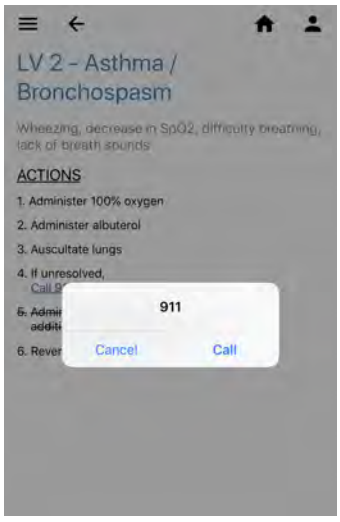
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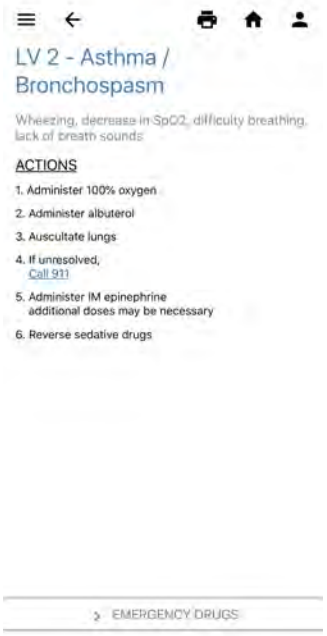
Wheezing, decrease in SpO2, difficulty breathing, lack of breath sounds
ACTIONS
1. Administer 100% oxygen
2. Administer albuterol
3. Auscultate lungs
4. If unresolved,
911
Cancel
Call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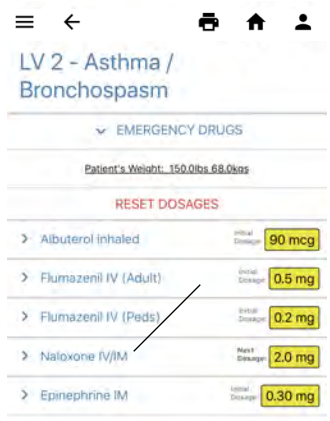
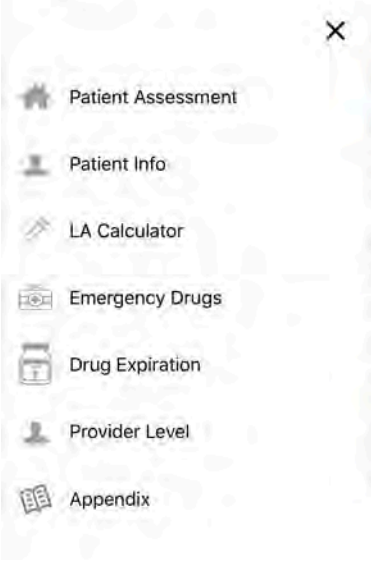
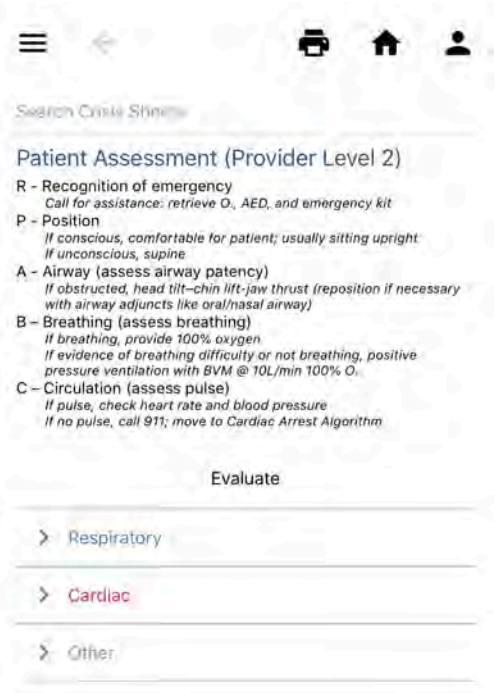

LV 2 - Asthma / Bronchospasm
EMERGENCY DRUGS
Patient's Weight: 150.0lbs 68.0kgs
RESET DOSAGES
Albuterol inhaled 90 mcg
Flumazenil IV (Adult) 0.5 mg
Flumazenil IV (Peds) 0.2 mg
Naloxone IV/IM 2.0 mg
Epinephrine IM 0.30 mg


LV 2 - Asthma / Bronchospasm
EMERGENCY DRUGS
Patient's Weight: 150.0lbs 68.0kgs
RESET DOSAGES
Albuterol inhaled 90 mcg
Drug Name:
Albuterol inhaled
Note:
2 puffs inhaled
Info: 1 actuation = 108 mcg albuterol sulfate equivalent to 90 mcg albuterol base
Dose T
Time T
Information:
allergic reaction, asthma
Flumazenil IV (Adult) 0.5 mg
Flumazenil IV (Peds) 0.2 mg
Naloxone IV/IM 2.0 mg


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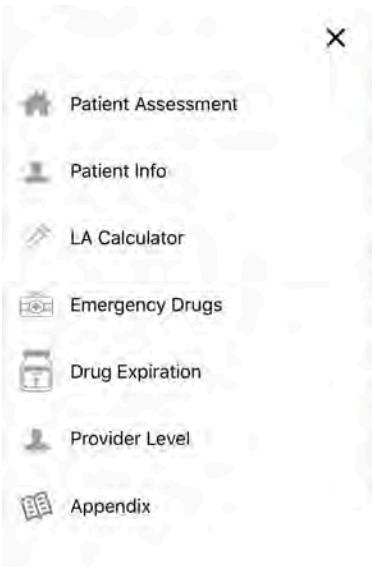
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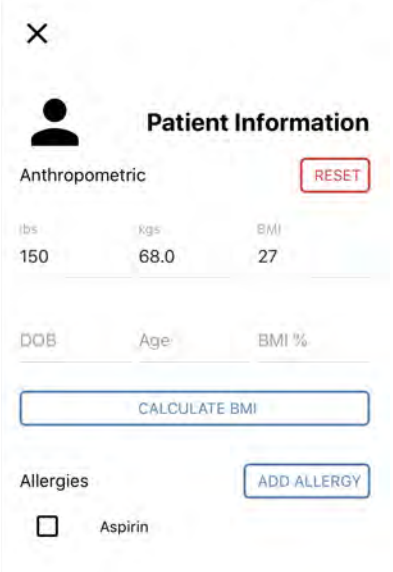
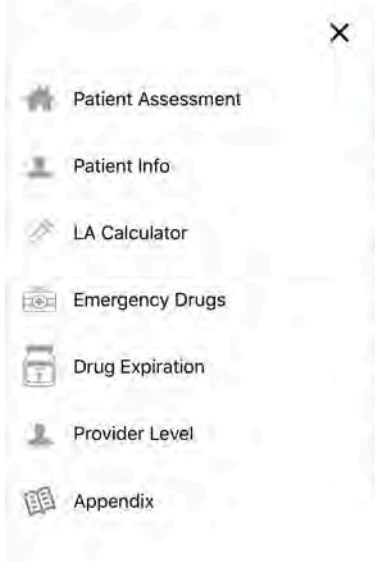

Patient Information
Anthropometric
RESET
lbs
150
kgs
68.0
BMI
27
DOB
Age
BMI %
CALCULATE BMI
Allergies
ADD ALLERGY
Aspirin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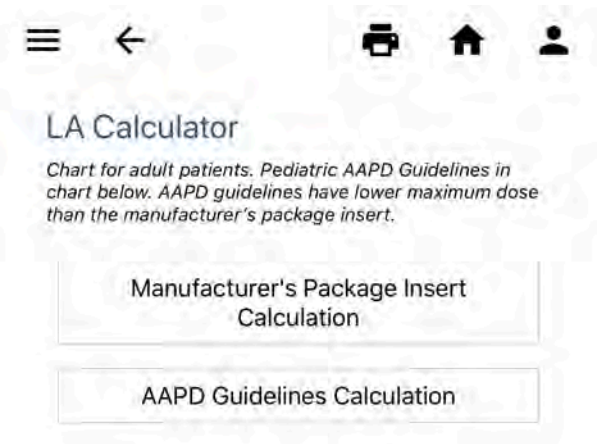
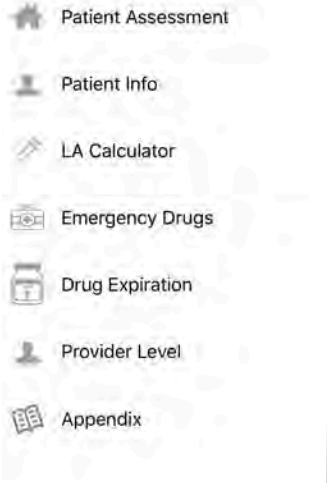

LA Calculator
Chart for adult patients. Pediatric AAPD Guidelines in chart below. AAPD guidelines have lower maximum dose than the manufacturer's package insert.
Manufacturer's Package Insert Calculation
AAPD Guidelines Calculation


Manufacturer's Package Insert Calculator
Reset
LA Toxicity
Patient's Weight: 150lbs 68.0kgs
Total 0.0%
Articaine: 4% w/ epinephrine 0.0%
Note: Age > 4 y.o.
Lidocaine: 2% w/ epinephrine 0.0%
Mepivacaine: 3% plain 0.0%
Mepivacaine: 2% w/ levonordefrin 0.0%
Prilocaine: 4% plain 0.0%
Prilocaine: 4% w/ epinephrine 0.0%
Bupivacaine: 0.5% w/ epinephrine 0.0%
Note: Age > 12 y.o.


Manufacturer's Package Insert Calculator
Reset
LA Toxicity
Patient's Weight: 150lbs 68.0kgs
Total 22.7%
Articaine: 4% w/ epinephrine 22.7%
Note: Age > 4 y.o.
Local Anesthetic Maximum Dose
Max Dose (mg/kg) 7.0
Max Calc (mg) 476.0
Absolute MAX Cartridge # 6.6
Cartridge Used (Input) 1.5
% Max Used 22.7%
Lidocaine: 2% w/ epinephrine 0.0%
Mepivacaine: 3% plain 0.0%
Mepivacaine: 2% w/ levonordefrin 0.0%
Prilocaine: 4% plain 0.0%
Prilocaine: 4% w/ epinephrine 0.0%
Bupivacaine: 0.5% w/ epinephrine 0.0%
Note: Age > 12 y.o.


Manufacturer's Package Insert Calculator
Reset
LA Toxicity
Patient's Weight: 150lbs 68.0kgs
Total 115.6%
Articaine: 4% w/ epinephrine 75.6%
Note: Age > 4 y.o.
Local Anesthetic Maximum Dose
Max Dose (mg/kg) 7.0
Max Calc (mg) 476.0
Absolute MAX Cartridge # 6.6
Cartridge Used (Input) 5
% Max Used 75.6%
Lidocaine: 2% w/ epinephrine 0.0%
Mepivacaine: 3% plain 0.0%
Mepivacaine: 2% w/ levonordefrin 0.0%
Prilocaine: 4% plain 0.0%
Prilocaine: 4% w/ epinephrine 0.0%
Bupivacaine: 0.5% w/ epinephrine 40.0%
Note: Age > 12 y.o.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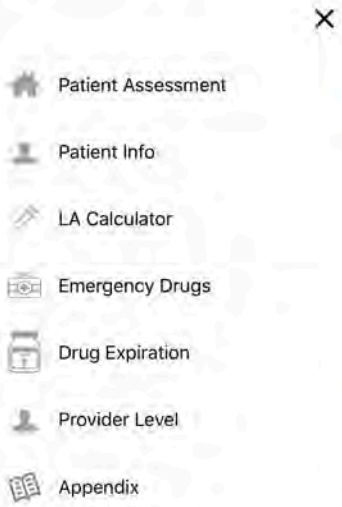
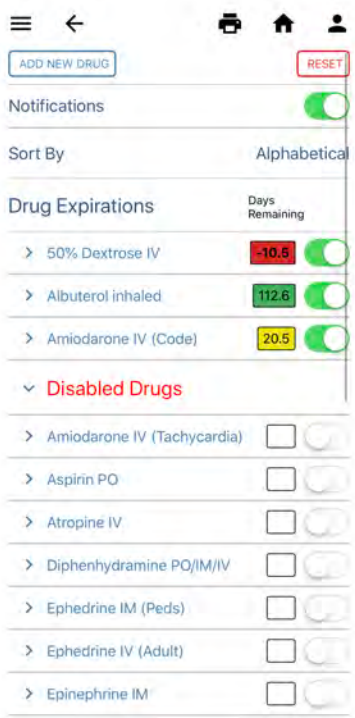
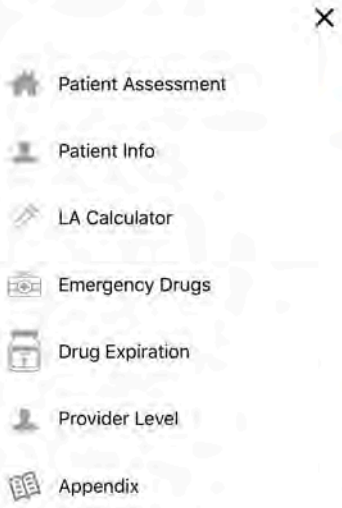
Provider Level
Appendix


Emergency Drugs
RESET
50% Dextrose IV Next Dosage: 25 g
Albuterol inhaled Initial Dosage: 90 mcg
Amiodarone IV (Code) Initial Dosage: 300 mg
Epinephrine IV (Cardiac Arrest) Initial Dosage: 1 mg
Naloxone IV/IM Next Dosage: 2.0 mg
Solu-Medrol IV Initial Dosage: 136 mg
Ephedrine IV (Adult) Initial Dosage: 10 mg
Nitroglycerin PO (Adult) Initial Dosage: 0.4 mg
Atropine IV Initial Dosage: 0.5 mg
Oxygen Initial Dosage: titrate SpO2%
Flumazenil IV (Adult) Next Dosage: 0.5 mg
Aspirin PO Next Dosage: 325 mg
z_Test drug Initial Dosage: 68 mg
Lidocaine IV Initial Dosage: 102 mg


Emergency Drugs
RESET
50% Dextrose IV Next Dosage: 25 g
Drug Name:
50% Dextrose IV
Note:
0.5 g/kg IV
MAX: 25 grams
NOTE: Slow injection
Dose 1
20
Time 1
20:20 04/06/19
Dose 2
Time 2
Information:
hypoglycemia
Albuterol inhaled Initial Dosage: 90 mcg
Amiodarone IV (Code) Initial Dosage: 300 mg
Epinephrine IV (Cardiac Arrest) Initial Dosage: 1 mg
Naloxone IV/IM Next Dosage: 2.0 mg
Solu-Medrol IV Initial Dosage: 136 mg


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


ADD NEW DRUG
RESET
Notifications
Sort By
Alphabetical
Drug Expirations
Days Remaining
50% Dextrose IV
-10.5
Albuterol inhaled
112.6
Amiodarone IV (Code)
20.5
Disabled Drugs
Amiodarone IV (Tachycardia)
Aspirin PO
Atropine IV
Diphenhydramine PO/IM/IV
Ephedrine IM (Peds)
Ephedrine IV (Adult)
Epinephrine IM


Patient Assessment
Patient Info
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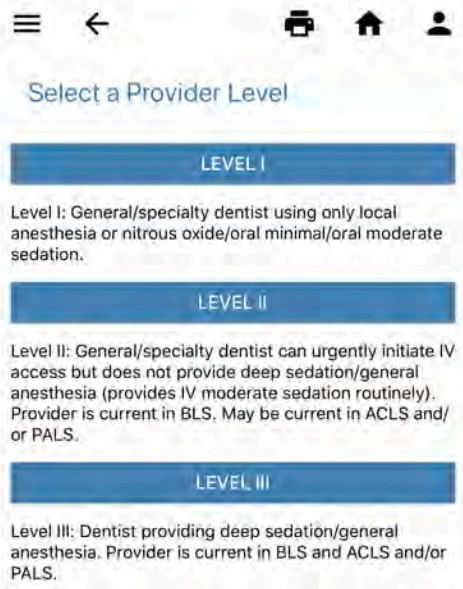
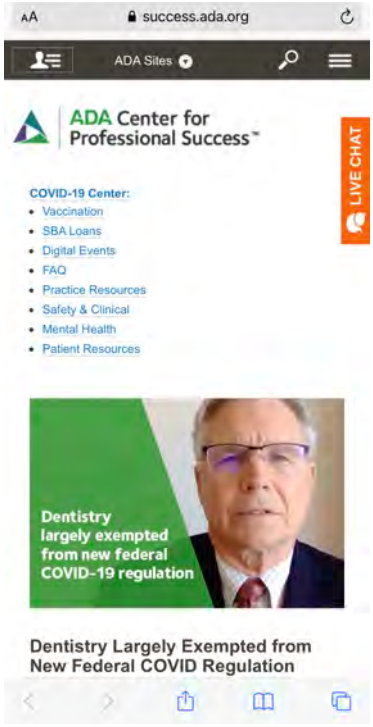
Emergency Drugs
Drug Expiration
Provider Level
Appendix

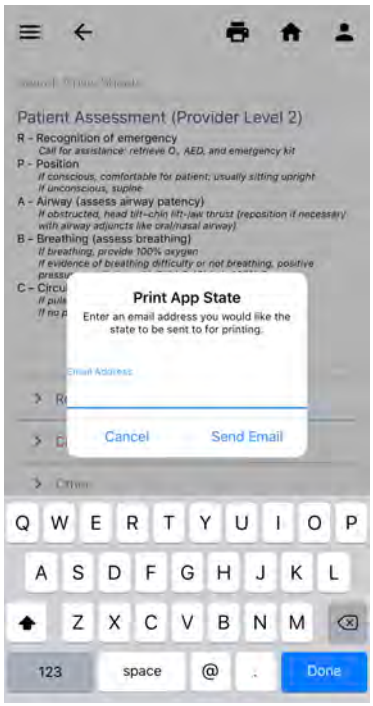

Select a Provider Level
LEVEL I
Level I: General/specialty dentist using only local anesthesia or nitrous oxide/oral minimal/oral moderate sedation.
LEVEL II
Level II: General/specialty dentist can urgently initiate IV access but does not provide deep sedation/general anesthesia (provides IV moderate sedation routinely). Provider is current in BLS. May be current in ACLS and/or PALS.
LEVEL III
Level III: Dentist providing deep sedation/general anesthesia. Provider is current in BLS and ACLS and/or PALS.


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


Appendix
Ten Minutes Saves A Life!
COVID-19
ASDA Interim guidance for office anesthesia
American Dental Association
American Society of Anesthesiologists
ASA Covid-19 Resources From Other Organizations
Anesthesia Patient Safety Foundation
Anesthesiology journal special article series
Centers for Disease Control and Prevention
CDC Guidance for Dental Settings
Environmental Protection Agency
Occupational Safety and Health Administration
National Institute for Occupational Safety and Health
Society for Ambulatory Anesthesia
World Health Organization
ASA Roadmap for Resuming Elective Surgery
Centers for Medicare and Medicaid Serves
Opening Up American Again
ADSA COVID-19 Resources
ADSA COVID-19
Front Desk Screening Questions
COVID-19 Screening forms (made interactive)
Patient Screening Form
Daily Screening Log
Patient Advisory and Acknowledgment


AA
success.ada.org
ADA Sites
ADA Center for Professional Success™
LIVE CHAT
COVID-19 Center:
Vaccination
SBA Loans
Digital Events
FAQ
Practice Resources
Safety & Clinical
Mental Health
Patient Resources
Dentistry largely exempted from new federal COVID-19 regulation
Dentistry Largely Exempted from New Federal COVID Regulation


ada.org
1 of 12
ADA American Dental Association®
Guidelines for the Use of Sedation and General Anesthesia by Dentists
Adopted by the ADA House of Delegates, October 2016
I. Introduction
II. Definitions
Methods of Anxiety and Pain Control
minimal sedation (previously known as anxiolysis) - a minimally depressed level of consciousness, produced by a pharmacological method, that retains the patient's ability to independently and continuously maintain an airway and respond normally to tactile stimulation and verbal command. Although cognitive function and coordination may be modestly impaired, ventilatory and cardiovascular functions are unaffected.
Patients whose only response is reflex withdrawal from repeated painful stimuli would not be considered to be in a state of minimal sedation.
The following definitions apply to administration of minimal sedation:
maximum recommended dose (MRD) - maximum FDA recommended dose of a drug, as context in FDA-approved labeling for unmonitored home use.
dosing for minimal sedation via the enteral route - minimal sedation may be achieved by the administration of a drug, either singly or in divided doses, by the enteral route to achieve the desired clinical effect, not to exceed the maximum recommended dose (MRD).
The administration of enteral drugs exceeding the maximum recommended dose during a single appointment is considered to be moderate sedation and the moderate sedation guidelines apply.
Nitrous oxide/oxygen when used in combination with sedative agent(s) may produce minimal, moderate, deep sedation or general anesthesia.



Suggestions

- Download the application on all phones and iPads
- Have a designated iPad that is with the emergency kit (make sure it is charged)
- Download the PDF to all computers
- Print a copy of the PDF to have in the emergency kit (in case technology fails)
- PRACTICE WITH YOUR STAFF

Contributors

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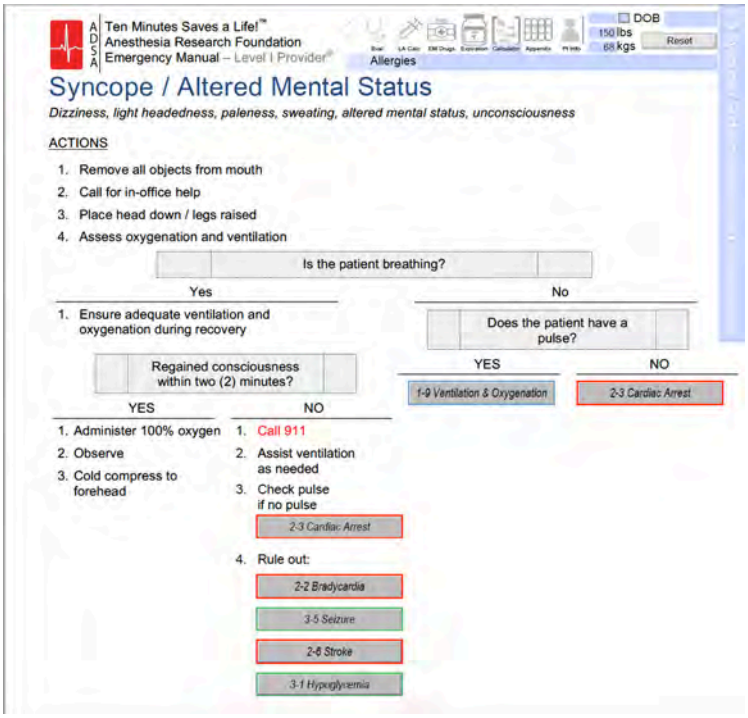
Part II

Medical Emergencies in the Dental Office

Emergency	Incidence
Syncope	15,407
Allergy	2,583
Angina pectoris	2,552
Postural hypotension	2,475
Seizures	1,595
Acute asthma	1,392
Hyperventilation	1,326
Epinephrine reaction	913
Hypoglycemia	890

Malamed SF. Medical Emergencies in the Dental Office, 6th edition, St. Louis, Mosby, 2006.

Syncope



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Anesthesia Research Foundation
Emergency Manual – Level I Provider®

DOB
150 lbs
68 kgs
Reset
Allergies

Syncope / Altered Mental Status

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

ACTIONS

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

Is the patient breathing?

Yes

1. Ensure adequate ventilation and oxygenation during recovery

Regained consciousness within two (2) minutes?

YES

1. Administer 100% oxygen
2. Observe
3. Cold compress to forehead

NO

1. Call 911
2. Assist ventilation as needed
3. Check pulse if no pulse

2-3 Cardiac Arrest

4. Rule out:

2-2 Bradycardia
3-5 Seizure
2-6 Stroke
3-1 Hypoglycemia

No

Does the patient have a pulse?

YES

1-9 Ventilation & Oxygenation

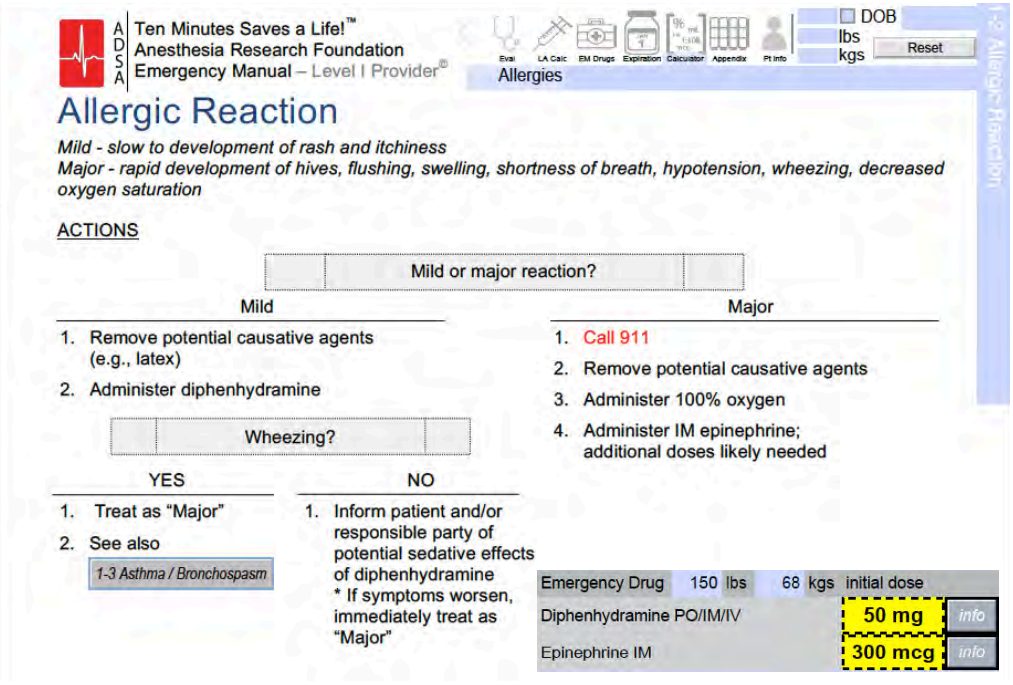
NO

2-3 Cardiac Arrest

Allergic Reaction/ Anaphylaxis

Diphenhydramine

Antihistamine
Dose: 50 mg-PO/IV/IM



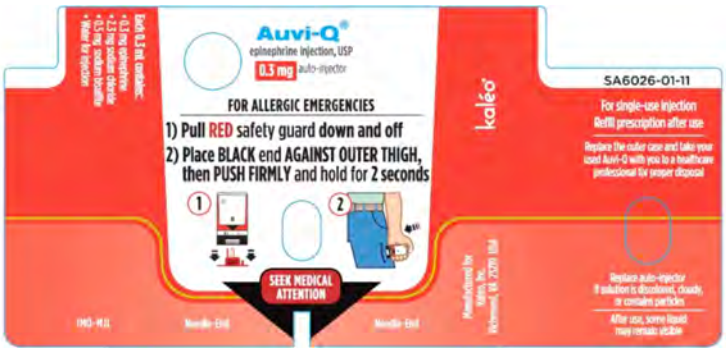
Epinephrine

1:1000/1:2000 (EpiPen®/EpiPen Jr®)

Adult: 0.3 mg IM (1:1000)
Pediatric: 0.15 mg IM (1:2000)

Epinephrine

1:1000



Injection, 0.3 mg: 0.3 mg/0.3 mL epinephrine injection, USP, pre-filled auto-injector
Injection, 0.15 mg: 0.15 mg/0.15 mL epinephrine injection, USP, pre-filled auto-injector
Injection, 0.1 mg: 0.1 mg/0.1 mL epinephrine injection, USP, pre-filled auto-injector

Epinephrine

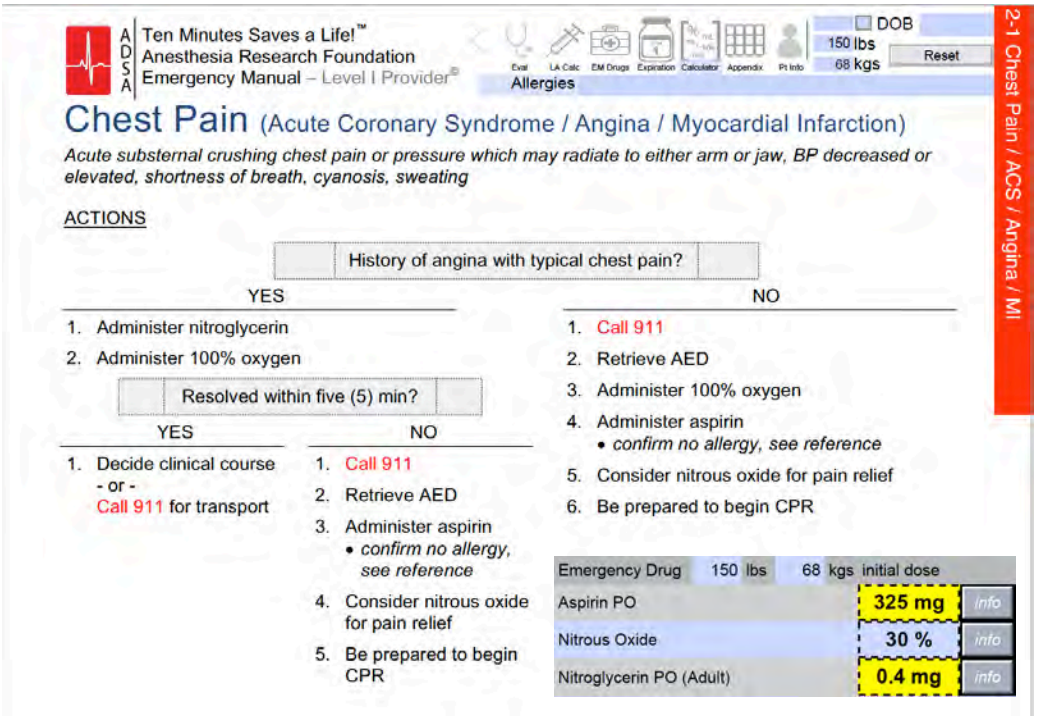
1:1000

Epinephrine 1:1000 (1 mg/mL)
(0.3 mg IM-adult; 0.15 mg IM-child)

Cardiac

Chest Pain: Angina

Chest Pain:
Myocardial Infarction



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Anesthesia Research Foundation
Emergency Manual – Level I Provider©

DOB
150 lbs
68 kgs
Reset
Allergies

2-1 Chest Pain / ACS / Angina / MI

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

Acute substernal crushing chest pain or pressure which may radiate to either arm or jaw, BP decreased or elevated, shortness of breath, cyanosis, sweating

ACTIONS

History of angina with typical chest pain?

YES

1. Administer nitroglycerin
2. Administer 100% oxygen

Resolved within five (5) min?

YES

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

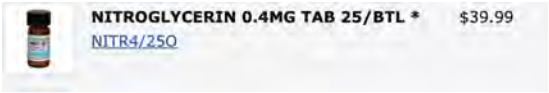
NO

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

NO

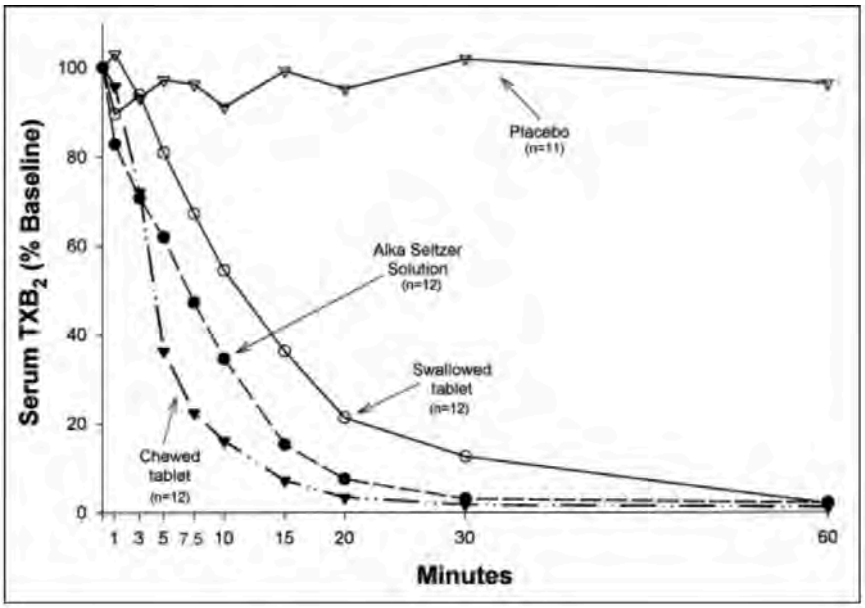
1. Call 911
2. Retrieve AED
3. Administer 100% oxygen
4. Administer aspirin
   - *confirm no allergy, see reference*
5. Consider nitrous oxide for pain relief
6. Be prepared to begin CPR

Emergency Drug	150 lbs	68 kgs	initial dose	
Aspirin PO			325 mg	info
Nitrous Oxide			30 %	info
Nitroglycerin PO (Adult)			0.4 mg	info



Aspirin

Anti-platelet
Dose: 325 mg
1 tablet chewed then swallowed



Feldman, M, Cryer, B. Aspirin absorption rates and platelet inhibition times with 325-mg buffered aspirin tablets (chewed or swallowed intact) and with buffered aspirin solution. American Journal of Cardiology 1999. Volume 84, Issue 4, Pages 404-409.

Chest Pain: Cardiac Arrest

Basic Life Support

Staff training (BLS)

- Every staff member should maintain current Basic Life Support skills
- Training should be updated annually at a minimum
- Ratio 30 compressions: 2 breaths (adult)
- Rate 100-120 compressions/minute
- Use of the AED/placement of AED pads
- Be sure to certify new staff members

Washington State Law

WAC 246-817-720

Basic Life Support Requirements

- Dental staff providing direct patient care in an in-office or out-patient setting must hold a current and valid health care provider basic life support (BLS) certification. Dental staff providing direct patient care include: Licensed dentists, licensed dental hygienists, licensed expanded function dental auxiliaries, certified dental anesthesia assistants, and registered dental assistants.
- Newly hired office staff providing direct patient care are required to obtain the required certification within forty-five days from the date hired.

Washington State Law

WAC 246-817-722

Defibrillator

- Every dental office in the state of Washington that administers minimal, moderate, or deep sedation, or general anesthesia, as defined in WAC 246-817-710, must have an automated external defibrillator (AED) or defibrillator.
- The dentist and staff must have access to the AED or defibrillator in an emergency, and it must be available and in reach **within sixty seconds.**

Automated External Defibrillator (AED)

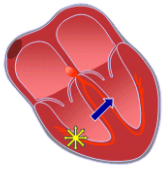
Turn on power
Attach electrodes

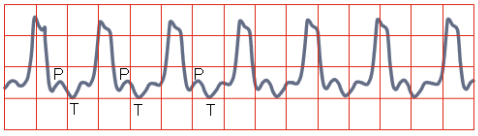
Operator “clears”
the victim

AED analyzes
rhythm

Shockable Rhythms

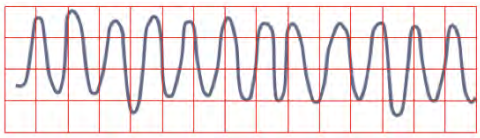
VENTRICULAR TACHYCARDIA
Impulses originate at ventricular pacemaker





Wide ventricular complexes. Rate > 120/min

VENTRICULAR FIBRILLATION
Chaotic ventricular depolarization



Rapid, wide irregular ventricular complexes

Administer a shock as indicated

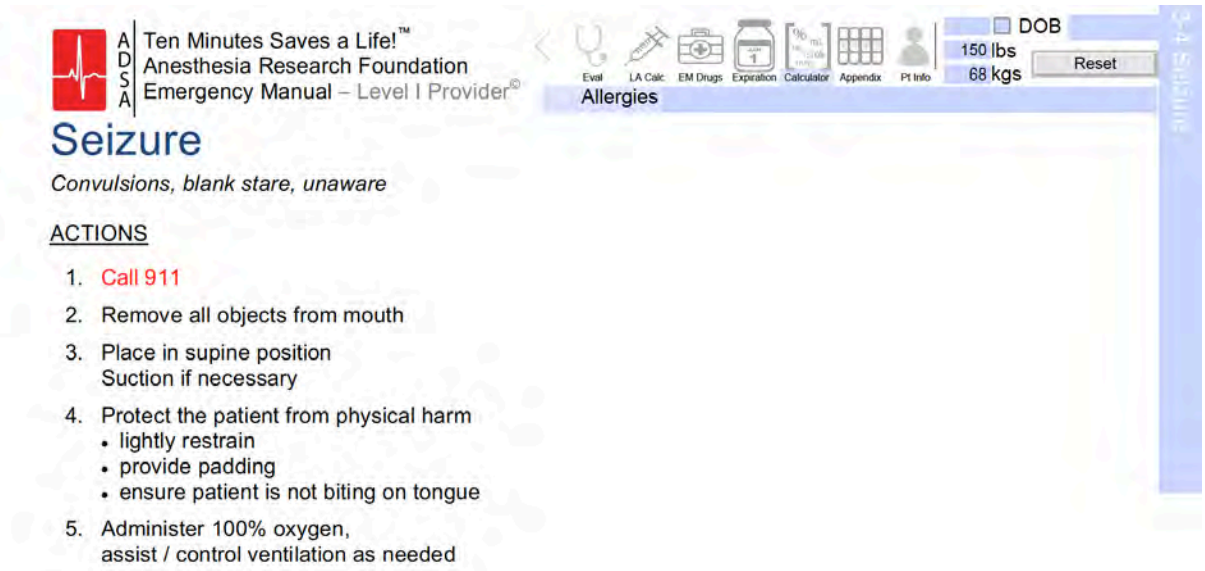
Postural Hypotension

Postural Hypotension

Treated with patience

- Occurs when a patient gets up too quickly after lying down
- Can be avoided by bringing the chair up slowly and allowing them to sit up for a few seconds prior to standing up
- Higher risk patients include the elderly and patients with severe cardiovascular disease

Seizure



Local Anesthetic Toxicity

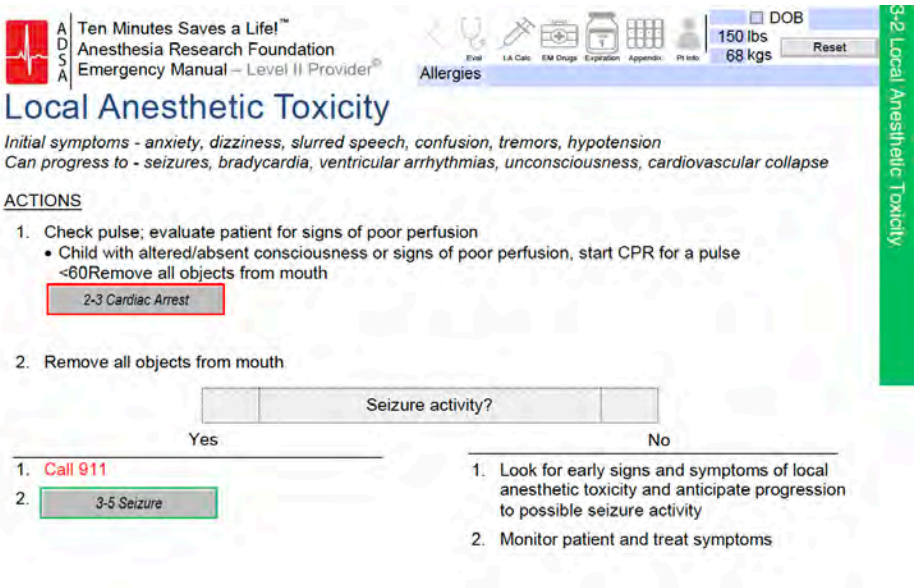
Local Anesthetic Toxicity

Signs & symptoms

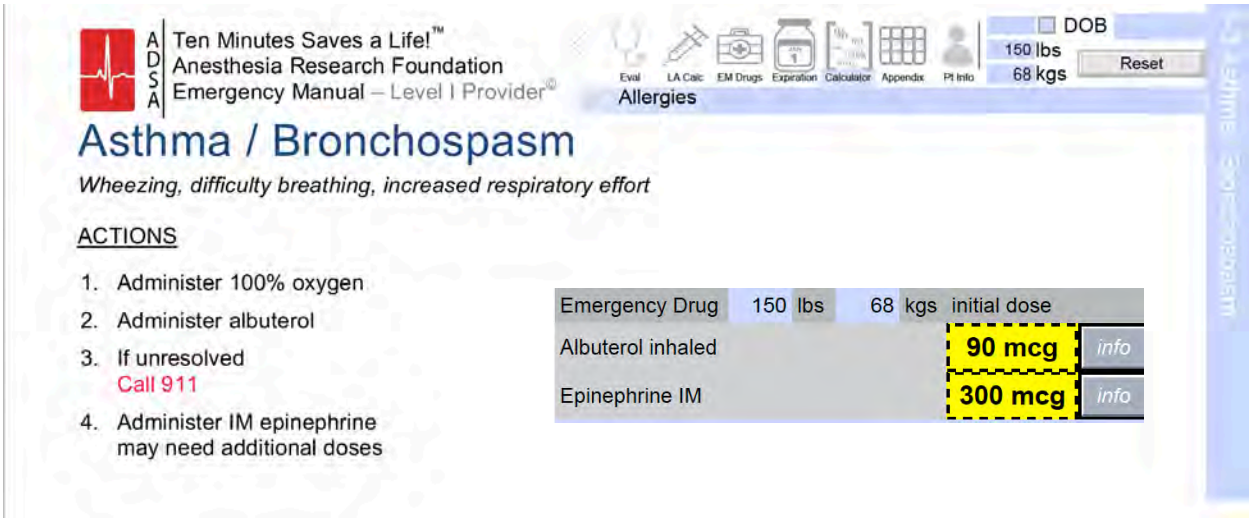
- Agitation
- Confusion
- Slurred speech
- Drowsy/unconscious
- Seizure activity
- Respiratory arrest
- Cardiopulmonary collapse

Maximum Recommended Doses

Local Anesthetic Maximum Dose (values from dental package insert)	
Type	Max Dose (mg/kg)
Articaine: 4% w/ epinephrine	7.0
Lidocaine: 2% w/ epinephrine	7.0 up to 500mg
Mepivacaine: 3% plain	6.6 up to 400mg
Mepivacaine: 2% w/ levonordefrin	6.6 up to 400mg
Prilocaine: 4% plain	8.0 up to 600mg
Prilocaine: 4% w/ epinephrine	8.0 up to 600mg
Bupivacaine: 0.5% w/ epinephrine NOTE: Age > 12 y.o.	Total up to 90 mg



Bronchospasm/ ‘Asthma Attack’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Eval
LA Calc
EM Drugs
Expiration
Calculator
Appendix
Pt Info
DOB
150 lbs
68 kgs
Reset
Allergies
Asthma / Bronchospasm
Wheezing, difficulty breathing, increased respiratory effort
ACTIONS
1. Administer 100% oxygen
2. Administer albuterol
3. If unresolved
Call 911
4. Administer IM epinephrine
may need additional doses
Emergency Drug 150 lbs 68 kgs initial dose
Albuterol inhaled 90 mcg info
Epinephrine IM 300 mcg info

Wheezing

Albuterol

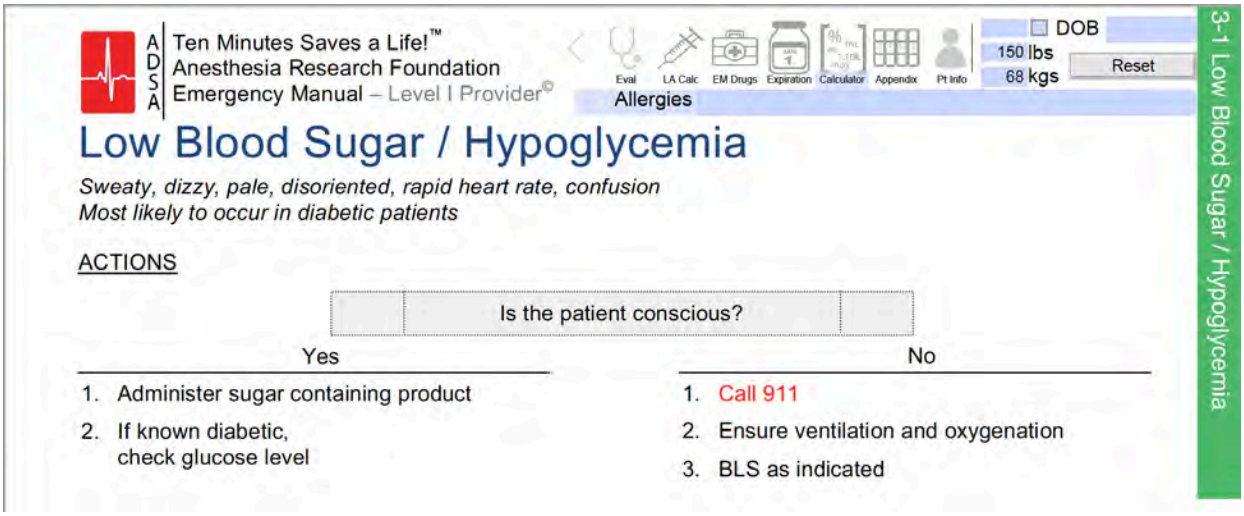
β_2 agonist
Dose: 1-2 puffs (90-180 mcg)
Make sure to shake and prime

Hyperventilation

Hyperventilation
Treatment

- Allow rebreathing of carbon dioxide
- Calm the patient and reassure them

Hypoglycemia



Glucose

Conscious patient

Foreign Body/ Airway Obstruction

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Eval | LA Calc | EM Drugs | Expiration | Appendix | Pt Info | DOB | 150 lbs | 68 kgs | Reset | Allergies

1-5 Choking / Foreign Body Airway Obstruction

Choking / Foreign Body Airway Obstruction

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

ACTIONS

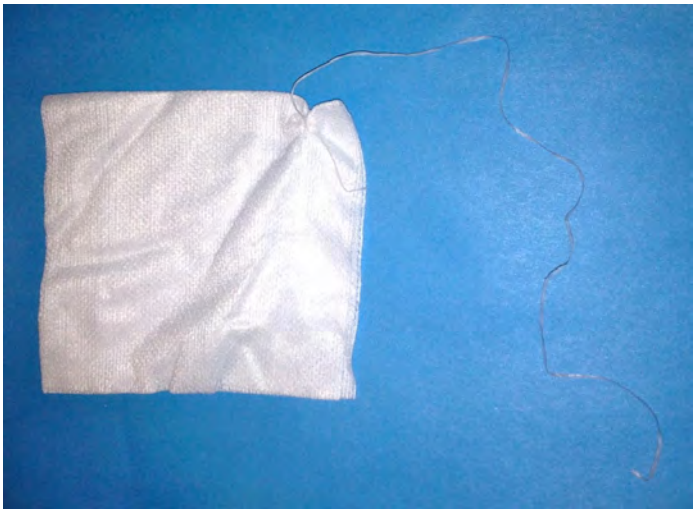
1. Sit the patient upright
2. Encourage coughing
3. If unable to cough or speak,
   administer uninterrupted abdominal thrusts until object is retrieved or patient becomes unresponsive
   (chest thrust for obese/pregnant patient)
   No blind finger sweep
4. Call 911
5. Reverse sedation as soon as possible;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

Flumazenil IV (Adult)	Next Dosage:	0.5 mg
Flumazenil IV (Peds)	Initial Dosage:	0.2 mg
Naloxone IV/IM	Initial Dosage:	0.40 mg

Prevention

Rubber Dam or Throat Screen/Pack

Make sure it is DAMP!!!



Practice, Practice, Practice!!!