

Medical Emergencies – Update 2020

Medical Emergencies Update 2020



1

Professional Responsibility



- A moral or legal obligation to ensure the safety or well being of others.



2

IMEP - Six Links of Survival



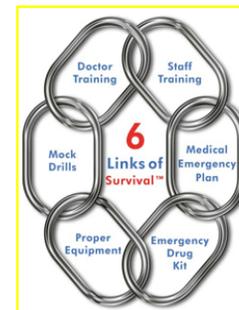
The average response time for medical emergency services (EMS) to respond to a 911 call can be **11 minutes** in an urban setting and **15 minutes** in a rural setting.



“Ten Minutes to Save a Life”

3

IMEP - Six Links of Survival



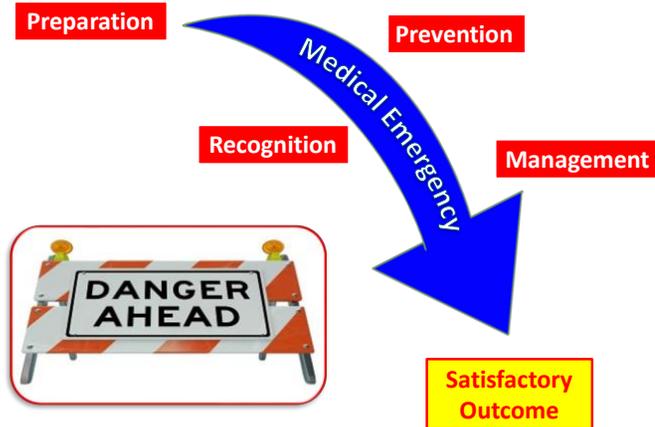
1. Doctor training
2. Staff training
3. Medical emergency plan
4. Emergency drug kit
5. Proper equipment
6. Mock drills

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September 28, 2020

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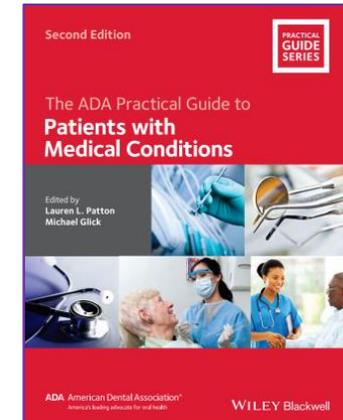
Basic Outline for Lecture



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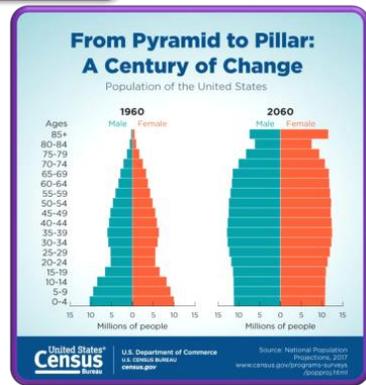
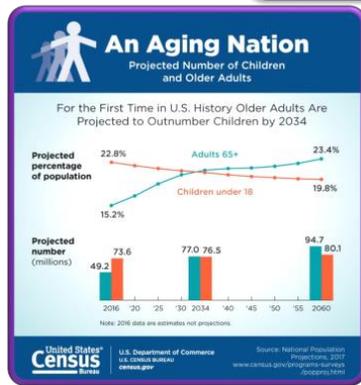
Medically Complicated Patients

- ✓ Cardiac Disease
- ✓ Diabetes Mellitus
- ✓ Renal Dialysis
- ✓ Organ Transplants
- ✓ Immune Disorders
- ✓ Liver Failure
- ✓ Anticoagulated Pt



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Here Come The Baby Boomers

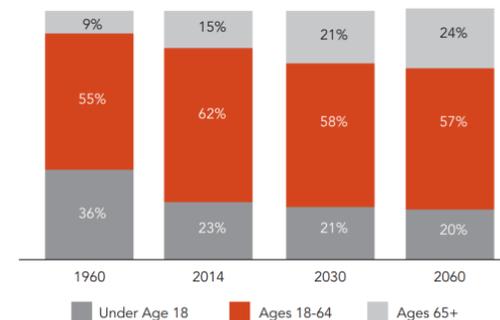


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Here Come The Baby Boomers

By 2060, Nearly One-Quarter of Americans Will Be Ages 65 and Older.

Percent of U.S. Population in Selected Age Groups, 1960 to 2060



Note: Numbers may not sum to 100 due to rounding.

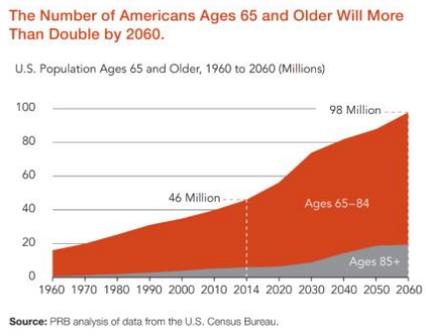
Source: PRB analysis of data from the U.S. Census Bureau.

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Here Come The Baby Boomers



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“↑Age => Multimorbidity”



MULTIMORBIDITY

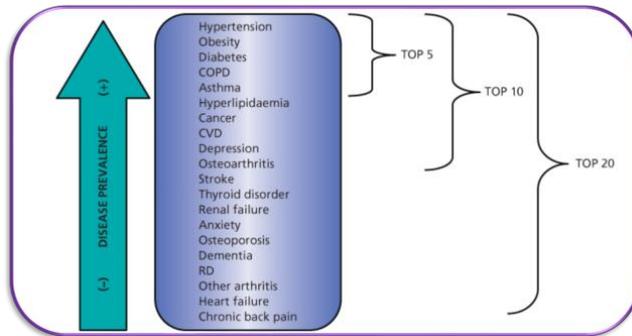
When **someone** has **two or more** long-term health conditions.



NICE National Institute for Health and Care Excellence

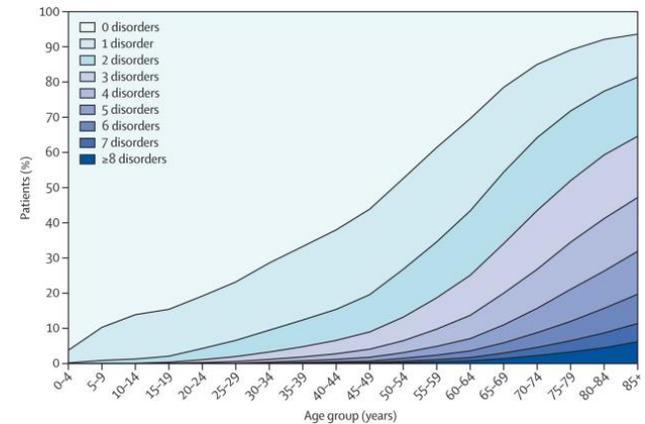
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“↑Age => Multimorbidity”



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“↑Age => Multimorbidity”

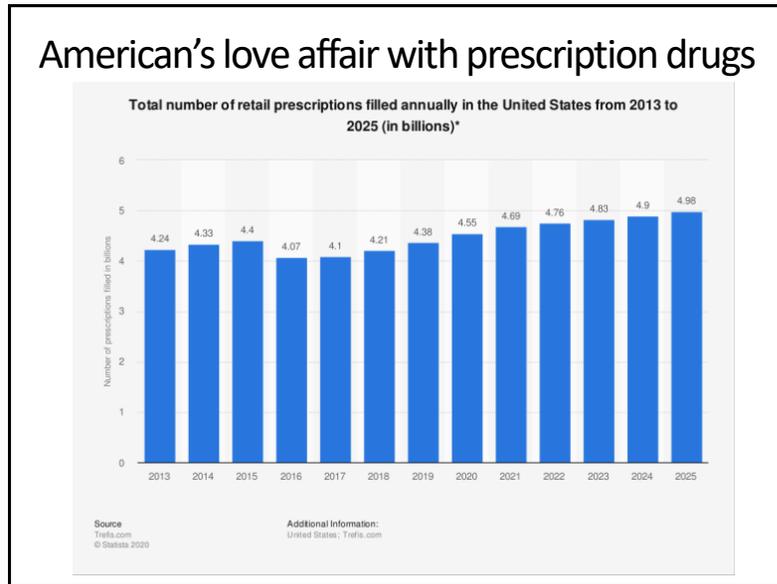


Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *The Lancet* 2012, 380:37-43

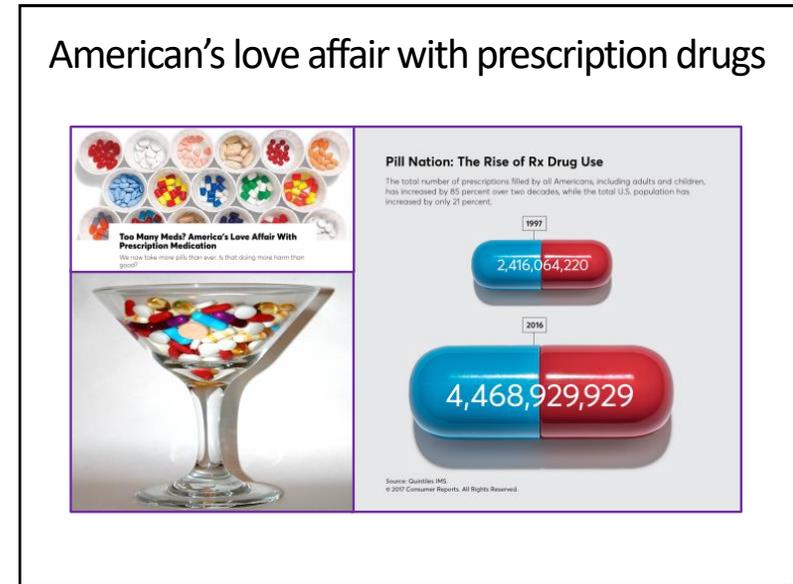
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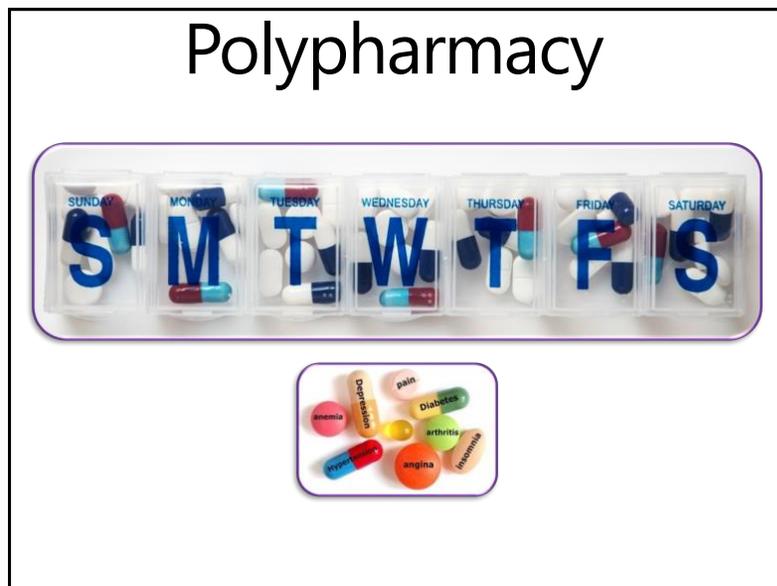
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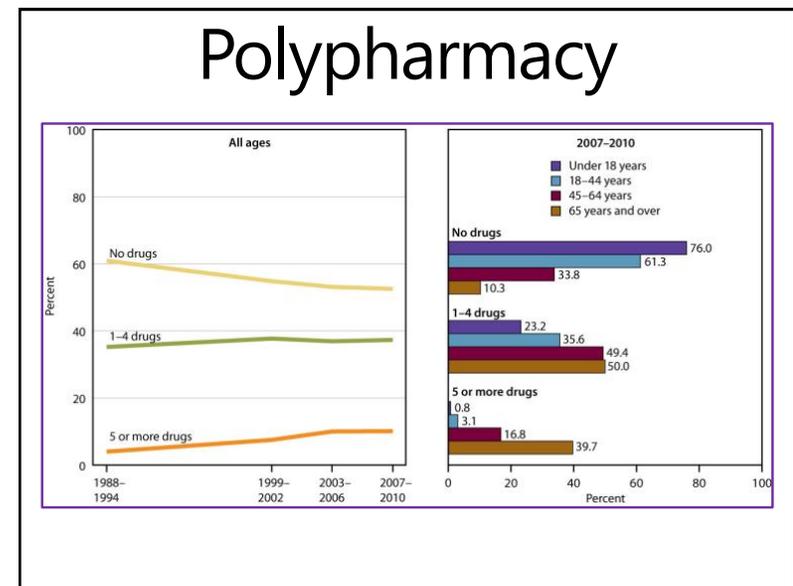
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Med Emerg on the Rise

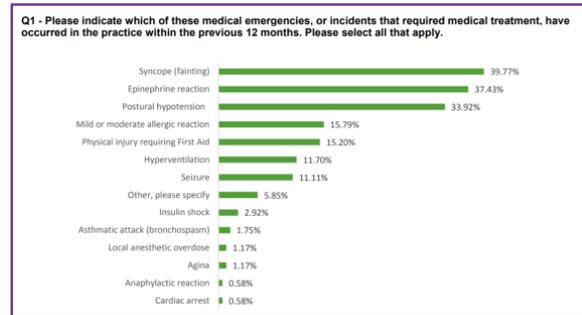


- Older patients
- + Multimorbidities
- + Polypharmacy
- + Longer appts
- + Invasive procedures



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Frequency of Med Emerg in Dental Office



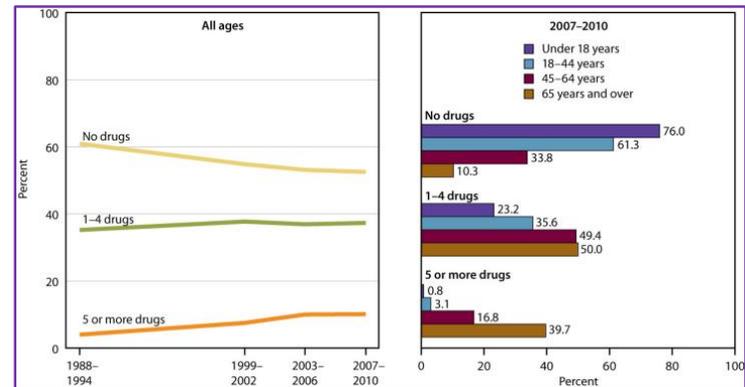
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Polypharmacy



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Polypharmacy



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Med Emerg on the Rise



- Older patients
- + Multimorbidities
- + Polypharmacy
- + Longer appts
- + Invasive procedures



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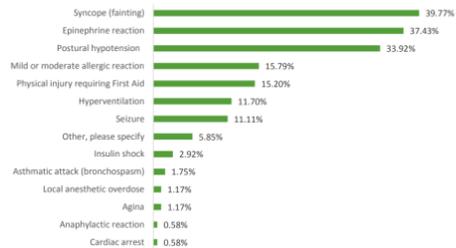


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Frequency of Med Emerg in Dental Office



Q1 - Please indicate which of these medical emergencies, or incidents that required medical treatment, have occurred in the practice within the previous 12 months. Please select all that apply.



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Frequency of Med Emerg in Dental Office

Dentophobia: Fear of Dentists

Fear the drill?
Modern dentistry techniques, such as air abrasion, have replaced many of the traumatic dental practices of the past

Affects: 6,573,000

Common Phobia Statistics

Lots of people suffer from some of the most common phobias:

Phobia	Definition	% of people affected
Acrophobia	Fear of Heights	7.5%
Arachnophobia	Fear of Spiders	3.5%
Aerophobia	Fear of Flying	2.6%
Astraphobia	Fear of Thunder & lightning	2.1%
Dentophobia	Fear of Dentist	2.1%

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What precipitates the medical emergency

Stress is a common etiologic factor in emergency situations



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Office Preparation

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Emergency Equipment

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Critical Emergency Equipment

Equipment	Recommended	Alternative	Quantity
Oxygen delivery system	Positive pressure and demand valve	O ₂ delivery system with bag-valve-mask device	Minimum: 1 large adult, 1 child
	Pocket mask		1 per employee
Automated electronic defibrillator (AED)	Many		1 AED
Syringes for drug administration	Plastic disposable syringes with needles		3×2-mL syringes with needles for parenteral drug administration
Suction and suction tips	High-volume suction	Nonelectrical suction system	Office suction system
	Large-diameter, round-ended suction tips		Minimum 2
Tourniquets	Robber or Velcro tourniquet; rubber tubing	Sphygmomanometer	3 tourniquets and 1 sphygmomanometer
Magill intubation forceps	Magill intubation forceps		1 pediatric Magill intubation forceps

Medical Emergencies in the Dental Office, Malamed, 7th Edition

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Critical Emergency Equipment

Equipment	Recommended	Alternative	Quantity
Oxygen delivery system	Positive pressure and demand valve	O ₂ delivery system with bag-valve-mask device	Minimum: 1 large adult, 1 child



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Emergency Drugs

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Critical Emergency Drugs

Category	Generic drug	Proprietary drug	Alternative	Quantity	Availability
INJECTABLE					
Allergy – anaphylaxis	Epinephrine	Adrenalin	None	1 preloaded syringe + 3 x 1-mL ampules	1:1000 (1 mg/mL)
Allergy – histamine blocker	Diphenhydramine	Benadryl	Chlorpheniramine (Chlor-Trimeton)	3 x 1-mL ampules	50 mg/mL
NONINJECTABLE					
Oxygen	Oxygen	Oxygen		1 “E” cylinder	
Vasodilator	Nitroglycerin	Nitroglycerin spray	NitroStat sublingual tablets	1 metered spray bottle	0.4 mg/metered dose
Bronchodilator	Albuterol	Proventil, Ventolin, Proair, Respirol, Volmax	Metaproterenol	1 metered-dose inhaler	Metered-dose aerosol inhaler
Anthypoglycemic	Sugar	Orange juice, nondiet soft drink	Insta-Glucose gel	1 bottle	
Inhibitor of platelet aggregation	Aspirin	Many	Clopidogrel (Plavix)	2 packets of powdered aspirin	325 mg/dose

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EpiPen 2-Pak[®]



Category	Generic Drug	Proprietary Drug	Alternative	Quantity	Availability
Allergy - anaphylaxis - ADULT > 30 kg (66 lbs)	Epinephrine	Adrenalin	None	2 preloaded autoinjector syringes	0.3 mg/syringe
Allergy - anaphylaxis - PEDIATRIC 15-30 kg (33-66 lbs)	Epinephrine	Adrenalin	None	2 preloaded autoinjector syringes	0.15 mg/syringe



15 - 30 kg / 33-66 lbs

> 30 kg / > 66 lbs

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“Non-Critical” Emergency Drugs

Category	Generic drug	Proprietary drug	Alternative	Quantity	Availability
INJECTABLE					
Anticonvulsant	Midazolam	Midazolam	Diazepam	1 × 5-mL or 10-mL vial	5 mg/mL
Analgesic	Morphine sulfate	Generic	N ₂ O-O ₂	3 × 1-mL ampules	10 mg/mL
Vasopressor	Ephedrine	Generic		3 × 1-mL ampules	50 mg/mL
Antihypoglycemic	50% dextrose		Glucagon	1 vial	50-mL ampule
Corticosteroid	Hydrocortisone sodium succinate	Solu-Cortef	Dexamethasone	2 × 2-mL mix-o-vial	50 mg/mL
Antihypertensive	Esmolol	Brevibloc	Labetalol	2 × 100-mg/mL vial	100 mg/mL
Anticholinergic	Atropine	Generic	Scopolamine	3 × 1-mL ampules	0.5 mg/mL
NONINJECTABLE					
Respiratory stimulant	Aromatic ammonia	Generic		2 boxes	0.3 mL/Vaporole
Antihypertensive	Hydralazine		Nitroglycerin	1 bottle	25 mg tablets

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Prevention of Medical Emergencies

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Prevention of Med Emerg Recognition of risk

The image shows a screenshot of a medical history form. It includes sections for 'PATIENT INFORMATION', 'MEDICAL HISTORY', 'DENTAL HISTORY', and 'PHYSICIAN INFORMATION'. The form contains numerous checkboxes and text fields for recording patient data.

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Comprehensive Medical History

Past Medical History

Review of Systems

Current Medications

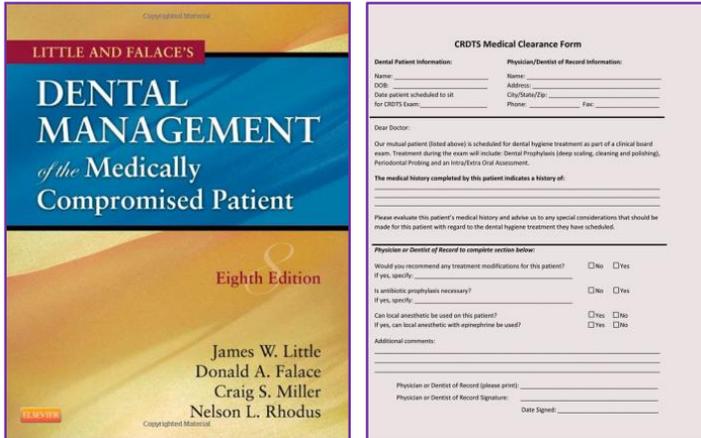
Past Hospitalizations

Medication Allergies

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Do we need a medical consultation ?



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Comprehensive Medical History The Quick Medical Consultation

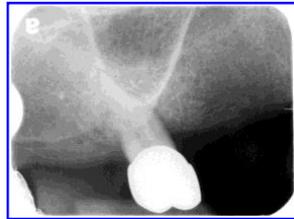
- Fax note to MD office
- Ask for a “Problem List”
- Ask for a “Medication List”



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“A Simple Extraction”

A handwritten dental form titled 'Simple Extraction' from Steven W. Beadnell, DMD. It includes fields for patient name (M. Bradnell), date (3/31/2010), and time (10:25 AM). The form has checkboxes for 'Extractions', 'Pre-anesthetic', and 'Expanded'. A grid for tooth extraction is shown with '1' in the upper right quadrant. Remarks include 'Please EXT #2' and 'Significant medical history - medication list attached'. Radiographs are noted as 'Were mailed'.



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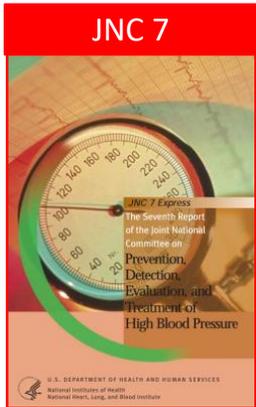
Problem List

Problem	ICD-9	Chronicity	Status	Onset	Last Assessment	User	Last Upd
ATRIAL FIBRILLATION	427.31	Chronic	Active	01/10/06		Joyce Berney MD	01/10/2006
CHF - CONGESTIVE HEART FAILURE	428.0	Chronic	Active	01/10/06		Joyce Berney MD	01/10/2006
ANXIETY DISORDER NOS	300.00	Chronic	Active	01/10/06		Joyce Berney MD	01/10/2006
ANGINA PECTORIS NECINOS	413.9	Chronic	Active	01/10/06		Joyce Berney MD	01/10/2006
CAD - CARDIOVASCULAR ARTEROSCLEROTIC DISEASE	414.00	Chronic	Active	01/10/06		Joyce Berney MD	01/10/2006
HYPOTHYROIDISM NOS	244.9	Chronic	Active	01/10/06		Joyce Berney MD	01/10/2006
GOUT NOS	274.9	Chronic	Active	01/10/06		Joyce Berney MD	01/10/2006
ESSENTIAL THROMBOCYTHEMIA	238.71	Chronic	Active	11/15/07		Joyce Berney MD	11/15/2007
COAGULAT DEFECT NECINOS	286.9	Chronic	Active	06/12/08		Joyce Berney MD	06/12/2008
BLINDNESS/LOW VISION	369.10	Comments: Protein C deficiency	Chronic Active	02/05/09		Joyce Berney MD	02/05/2009
HEARING LOSS NOS	389.9	Comments: for years	Chronic Active	02/05/09		Joyce Berney MD	02/05/2009
CHRONIC KIDNEY DISEASE UNSPECIFIED	585.9	Chronic	Active	07/30/10		Joyce Berney MD	07/30/2010

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Hypertension in the Dental Office



Medical Risk Factors (MRF)

- Prior Myocardial Infarction
- IHD – Angina
- High coronary disease risk
- Recurrent stroke prevention
- Diabetes
- Kidney disease

US Dept Health & Human Services, NIH, JNC7

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Hypertension in the Dental Office

Dental Treatment and Blood Pressure

SBP	DBP	MRF*	Dentist Guidelines
120-139	80-89	Yes/No	Routine Tx OK; Discuss HTN guidelines
140-159	90-99	Yes/No	Routine Tx OK; Refer for Med/Consult
160-179	100-109	No	Routine Tx OK; Refer for Med/Consult
		Yes	Urgent Tx OK; Refer for Med/Consult
180-209	110-119	No	No Tx w/o consult; Refer prompt Med/Consult
		Yes	No dental Tx; Refer emergent Med/Consult
≥ 210	≥ 120	Yes/No	No dental Tx: Refer emergent Med/Consult

*MRF = Medical Risk Factors

US Dept Health & Human Services, NIH, JNC7

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Blood Pressure – “Hypertension” JNC-8

Hypertension Today: JNC-8 Evidence-Based Guidelines



December 5, 2017

The New 2017 ACC/AHA Guidelines “Up the Pressure” on Diagnosis and Treatment of Hypertension

Philip Greenland, MD¹², Eric Peterson, MD, MPH¹⁴

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Blood Pressure – “Hypertension” JNC-8

Hypertension Today: JNC-8 Evidence-Based Guidelines

2017 Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults

BP Classification (JNC 7 and ACC/AHA Guidelines)

SBP	and	DBP	JNC 7	2017 ACC/AHA
<120	and	<80	Normal BP	Normal BP
120-129	and	<80	Prehypertension	Elevated BP
130-139	or	80-89	Prehypertension	Stage 1 hypertension
140-159	or	90-99	Stage 1 hypertension	Stage 2 hypertension
≥160	or	≥100	Stage 2 hypertension	Stage 2 hypertension

Blood Pressure should be based on an average of ≥2 careful readings on ≥2 occasions
Adults being treated with antihypertensive medication designated as having hypertension

December 5, 2017

The New 2017 ACC/AHA Guidelines “Up the Pressure” on Diagnosis and Treatment of Hypertension

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Blood Pressure – “Hypertension” JNC-8

Hypertension Today: JNC-8 Evidence-Based Guidelines

Blood Pressure Categories 2017

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

US Dept Health & Human Services, NIH, JNC8

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Blood Pressure – “Hypertension” JNC-8

Hypertension Today: JNC-8 Evidence-Based Guidelines

Blood Pressure Categories 2017

Systolic BP > 180
OR
Diastolic BP > 120

HYPERTENSIVE CRISIS (consult your doctor immediately) HIGHER THAN 180 and/or HIGHER THAN 120

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Hypertensive Crisis

Autoregulation of blood flow

Lower limit of autoregulation Upper limit of autoregulation

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Hypertensive Crisis

Leads to End Organ Damage

Complications of Hypertension: Target-Organ Damage

TIA, stroke LVH, CHD, HF Retinopathy Renal failure Peripheral vascular disease

TIA, transient ischemic attack; LVH, left ventricular hypertrophy; CHD, coronary heart disease; HF, heart failure

Signs / Symptoms of End Organ Damage ?

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Hypertensive Crisis => End Organ Damage



The relative frequency of end-organ involvement in hypertensive emergency

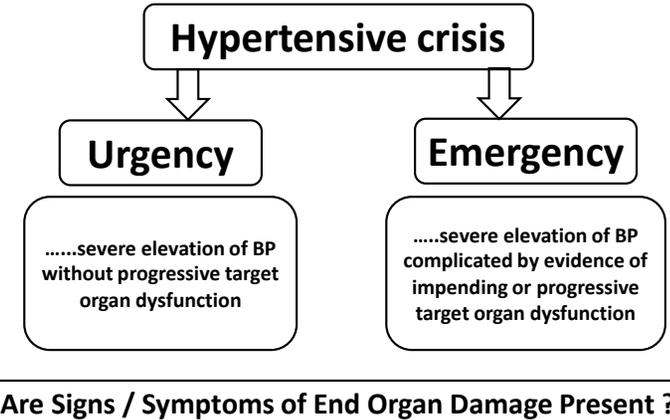
End-Organ Damage Type	Case (%)
Cerebral infarction	24.5
Intracerebral or subarachnoid bleed	4.5
Hypertensive encephalopathy	16.3
Acute Pulmonary Edema	22.5
Acute Congestive Heart Failure	14.3
Acute MI or unstable angina	12.0
Acute aortic dissection	2.0



Zampaglione, B, et al. Hypertensive urgencies and emergencies. Prevalence and clinical presentation. Hypertension 1996; 27:144-7

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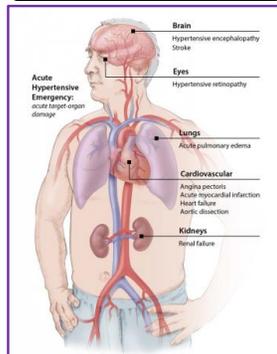
Hypertensive Crisis: Urgency vs Emergency



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Hypertensive Crisis – End Organ Damage

Target Organ Damage



Signs / Symptoms of End Organ Damage

CNS: Dizziness, headache, nausea, emesis, confusion, ischemic stroke, encephalopathy

Eyes: Ocular hemorrhage, blurred vision, loss of sight

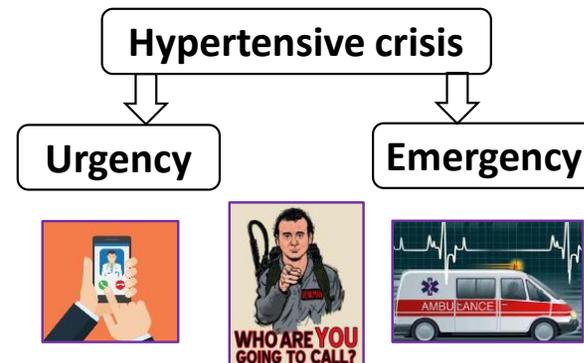
Heart: Angina, ACS, pulmonary edema, left ventricular failure, aortic dissection

Kidneys: Acute renal failure

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Hypertensive Crisis: Urgency vs Emergency

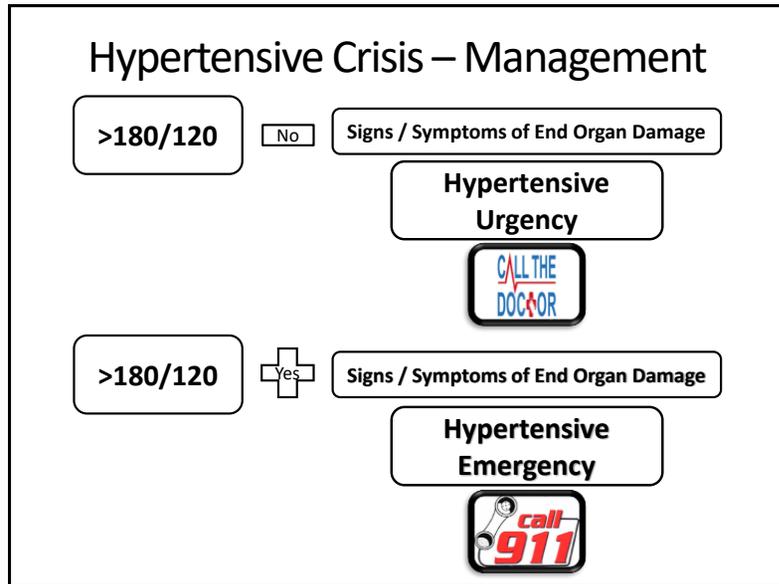
Systolic BP >180 mmHg OR Diastolic BP > 120mmHg



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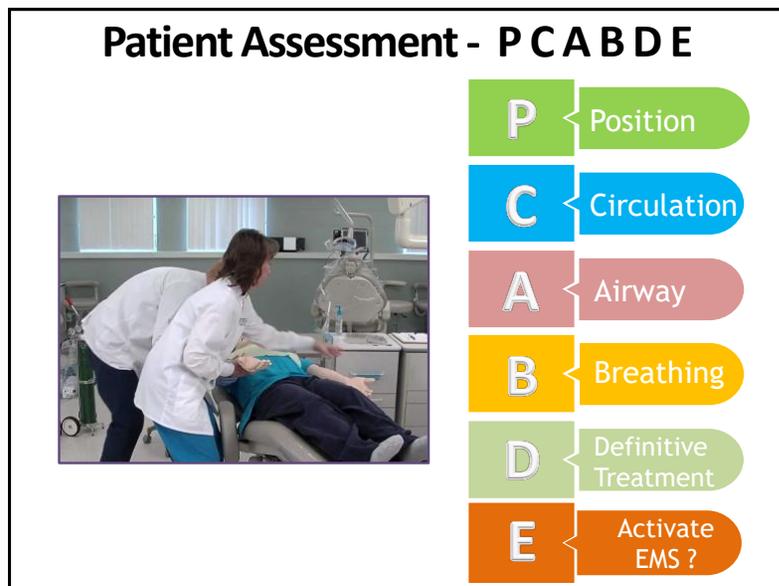
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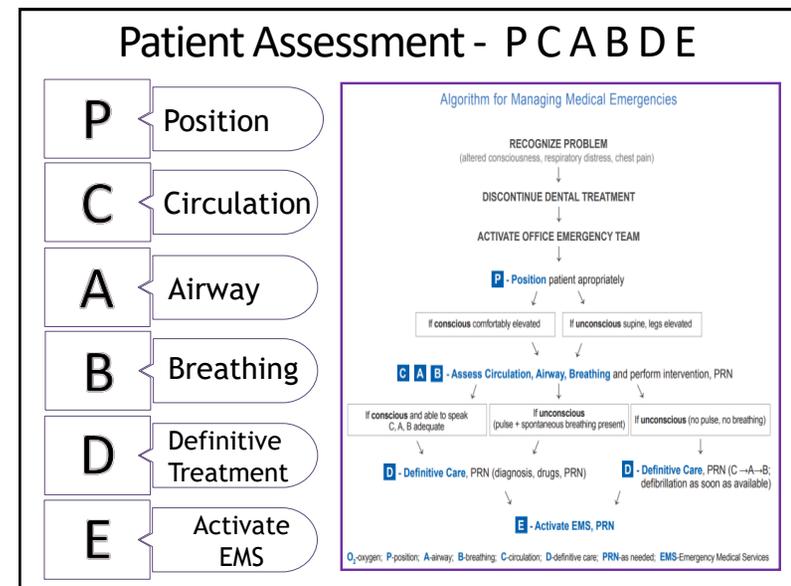
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Patient Assessment

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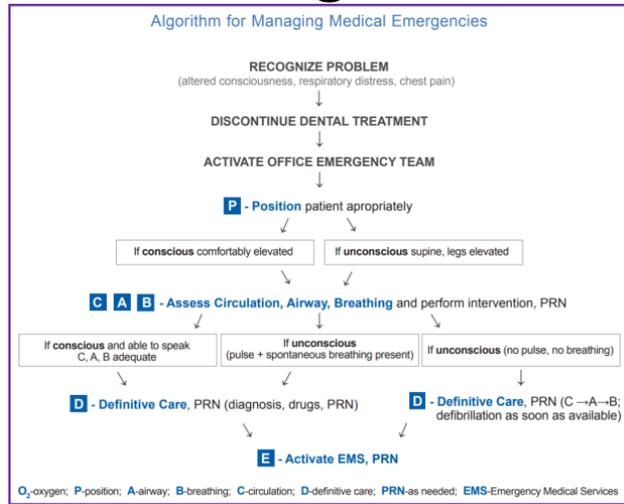


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Patient Management – BLS



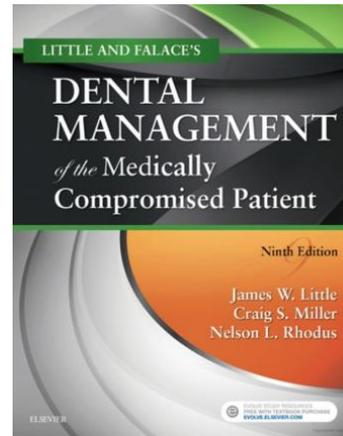
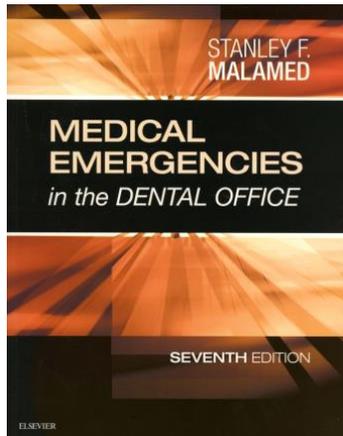
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1. Unable to make diagnosis
2. Know the diagnosis but are uncomfortable with it
3. Whenever you think EMS is warranted

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Reference Textbooks



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Unconscious Patient

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Unconsciousness in the Dental Chair

Differential Diagnosis

Cause	Frequency
Vasodepressor syncope (faint)	Most common
Drug administration or ingestion	Common
Orthostatic hypotension	Less common
Epilepsy	Less common
Hypoglycemic reaction	Less common
Acute adrenal insufficiency	Rare
Acute allergic reaction	Rare
Acute myocardial infarction	Rare
Cerebrovascular accident	Rare
Hyperglycemic reaction	Rare
Hyperventilation	Rare

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Basic Unconsciousness Treatment

Recognition of Unconsciousness



Position patient supine, feet elevated



Assess Circulation (Carotid pulse)
Artificial circulation if needed



Assess Breathing (Look, Listen, Feel)
Artificial ventilation if needed



Activate EMS if delayed recovery



Definitive management of cause



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Unconscious Patient

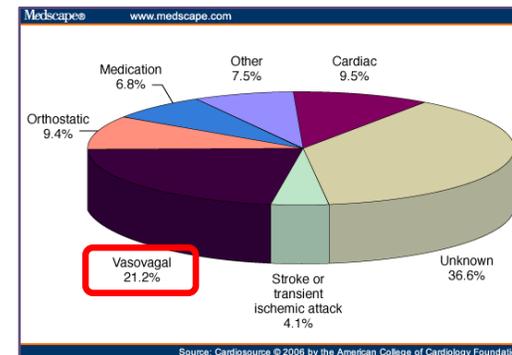
Vasodepressor

Syncope

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Syncope - Etiology

Temporary loss of consciousness caused by a fall in blood pressure



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Syncope – Predisposing Factors

Psychogenic

Fright
Anxiety
Emotional stress
Unwelcome news
Sight of blood

Nonpsychogenic

Upright position
Hunger
Exhaustion
Male gender
Age 16 – 35 yrs

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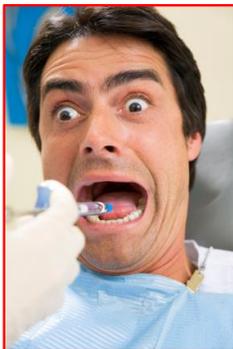
Normal Flight or Fight Response

Pain or fear
↓
Release of catecholamines (Adrenalin)
↓
Blood pumped to peripheral muscles
↓
Muscle activity – run or fight
↓
Blood pumped back to heart
↓
Normal cardiac output maintained



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Syncopal Reaction



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Syncopal Reaction

Pain or fear – Catecholamine release – Blood to muscles
↓
No muscle activity - Blood pools in muscles
↓
Compensatory => vasoconstriction, tachycardia
↓
Mechanoreceptors => reflex bradycardia, vasodilation
↓
Reduced cardiac output & hypotension
↓
Cerebral ischemia – loss of consciousness

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Syncope – Early signs and symptoms

- Feeling of warmth
- Loss of skin color
- pale, ashen
- Heavy perspiration
- Nausea
- “Feel bad”, “feel faint”
- Tachycardia (↑ pulse)

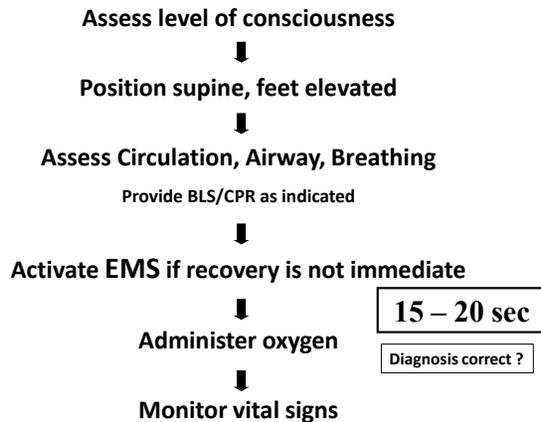
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Syncope – Late signs and symptoms

- Pupils dilation
- Yawning
- Rapid respirations
- Cold hands and feet
- Hypotension
- Bradycardia (↓ pulse)

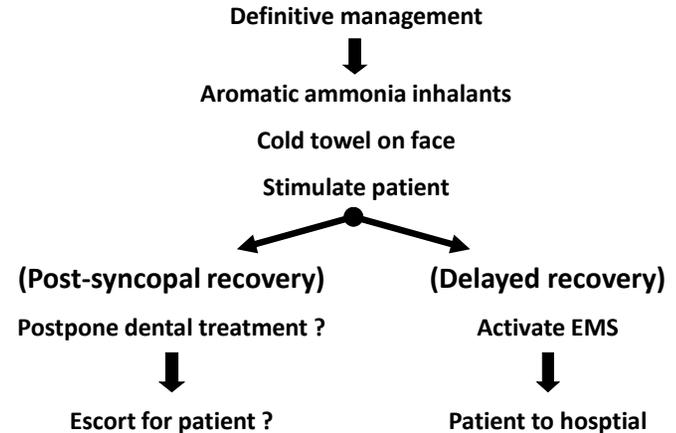
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Syncope Management



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Syncope Management



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Prevention of Syncope

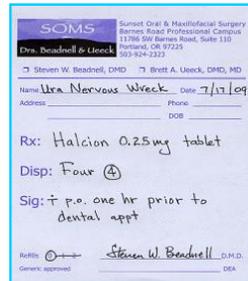
Patient positioning



Anxiety relief

Preop sedation

Nitrous oxide



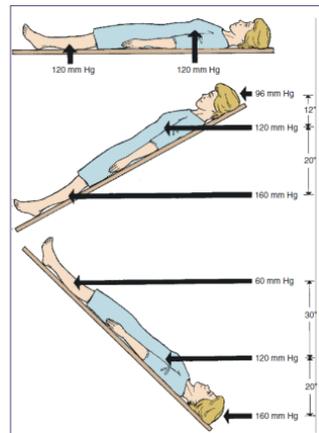
77

Unconscious Patient

Postural Hypotension

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Postural Hypotension



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Postural Hypotension

Predisposing factors

Drug administration

Prolonged recumbency

Inadequate postural reflex

Pregnancy

Addison's disease

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Medical Emergencies – Update 2020

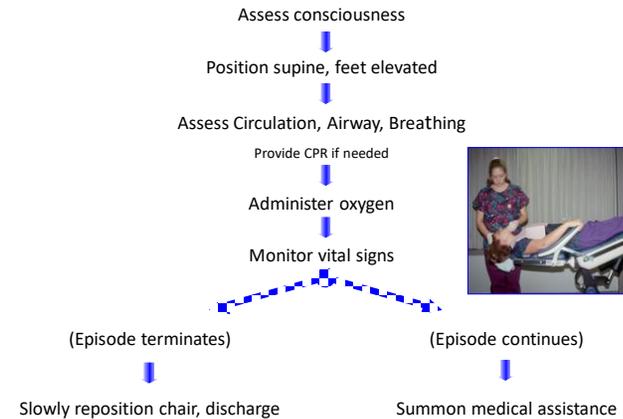
Postural Hypotension

Drugs causing postural hypotension

- Antianginals
- Antipsychotics
- Antiarrhythmics
- Beta-blockers
- Antidepressants
- Diuretics
- Antihistamines
- Phenothiazines
- Antihypertensives
- Tranquilizers

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Postural Hypotension Management



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Prevention of Postural Hypotension

PMH: medications, fainting Hx

Slowly discharge from supine



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Respiratory Emergencies

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September 28, 2020

Respiratory Distress

Potential Causes

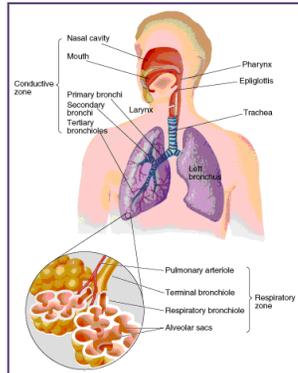
Hyperventilation

Syncope

Asthma

Heart Failure

Hypoglycemia



Acute MI

Anaphylaxis

Angioedema

Stroke

Epilepsy

85

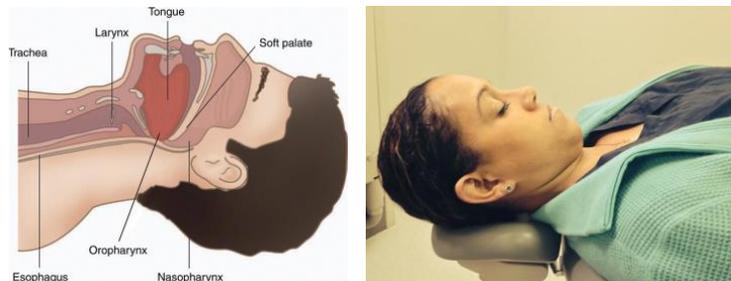
Respiratory Emergencies

Obstructed Airway

86

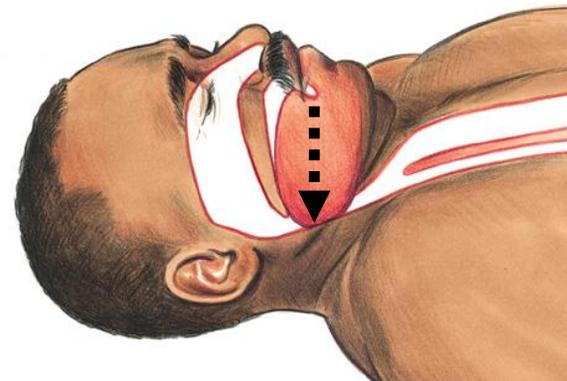
Airway Obstruction

Relaxed Tongue Blocks Airway



87

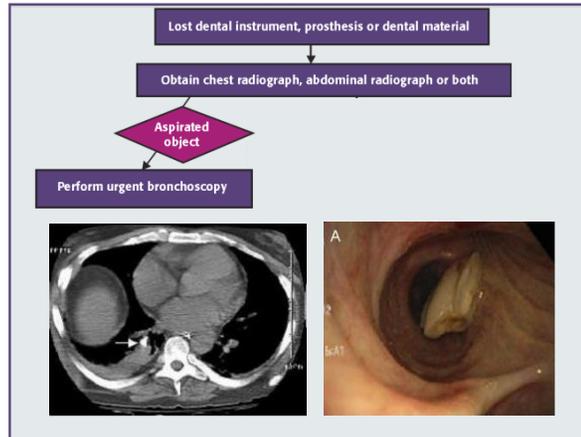
Airway Obstruction



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Medical Emergencies – Update 2020

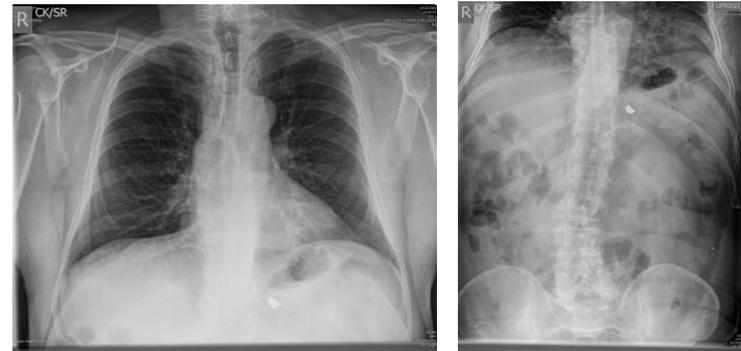
Management of Possible Aspiration



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Management of Swallowed Object

Swallowed object => Asymptomatic



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Management of Swallowed Object

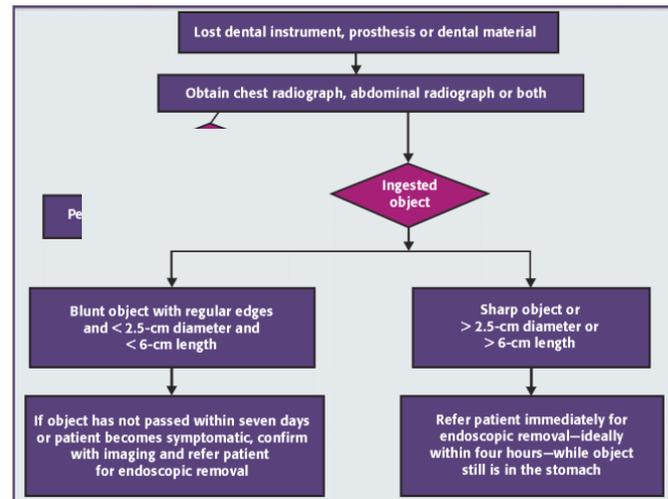
Potential for Bowel Perforation ?



Swallowed and aspirated dental prostheses and instruments in clinical dental practice. M Abusamaan; JADA 2014; 145(5):459-463.

95

Management of Swallowed Object



96

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Avoiding Aspiration



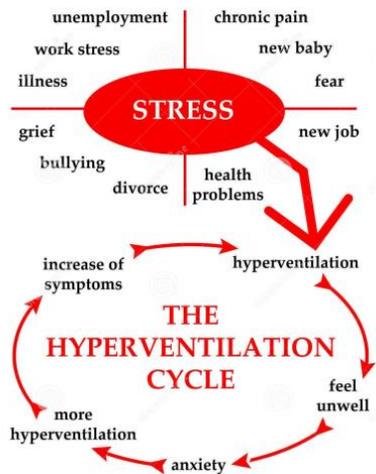
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Respiratory Emergencies

Hyperventilation

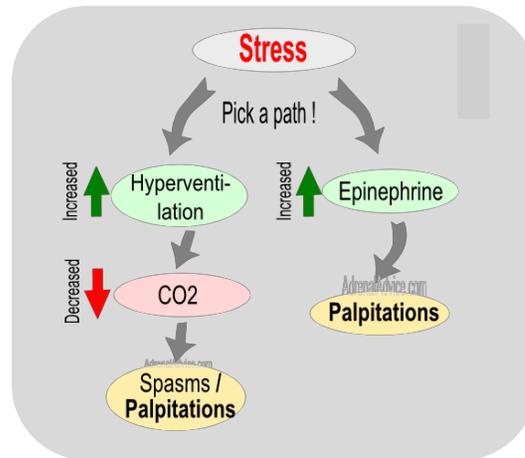
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Hyperventilation



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Hyperventilation - Pathophysiology



Medical Emergencies – Update 2020

Hyperventilation - Manifestations

Anxious patient

Shortness of breath
"Air hunger"

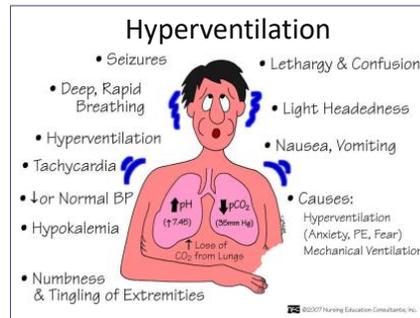
Palpitations

Tachycardia

Lightheadedness

Circumoral paresthesia

Carpopedal tetany



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Hyperventilation - Management

Position patient comfortably (upright)

C – A – B – BLS as needed

Remove dental materials from patient's mouth

Calm patient

Correct respiratory alkalosis

Drug management if needed – Versed, Valium

Complete treatment, discharge

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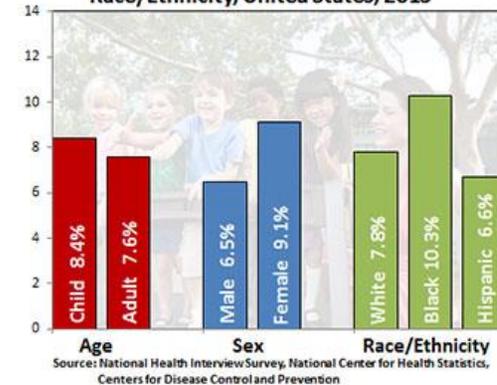
Respiratory Emergencies

Asthma

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Asthma

Current Asthma Prevalence Percents by Age, Sex, and Race/Ethnicity, United States, 2015



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Medical Emergencies – Update 2020

Asthma - Pathophysiology

Hyperactivity of tracheobronchial tree



Bronchial smooth muscle contraction

Bronchial wall edema

Mucus hypersecretion



Narrowed airways

↓

Wheezing

Shortness of breath

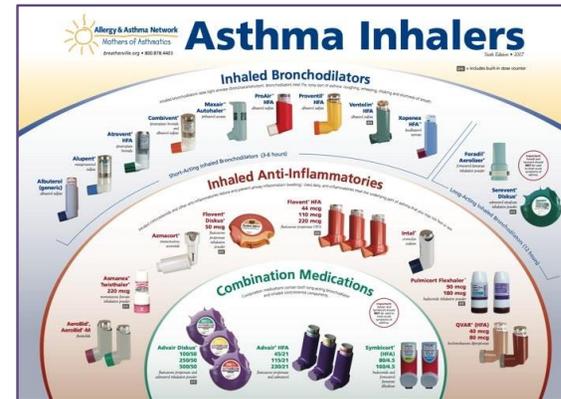
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Coughing



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Asthma Medical Management of Asthma



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Asthma – Signs and Symptoms

- Chest congestion/tightness
- Cough, wheezing, SOB
- Anxiety or agitation
- Increased respiratory rate
- Increased heart rate
- Pt wants to sit or stand up
- Use of accessory muscles

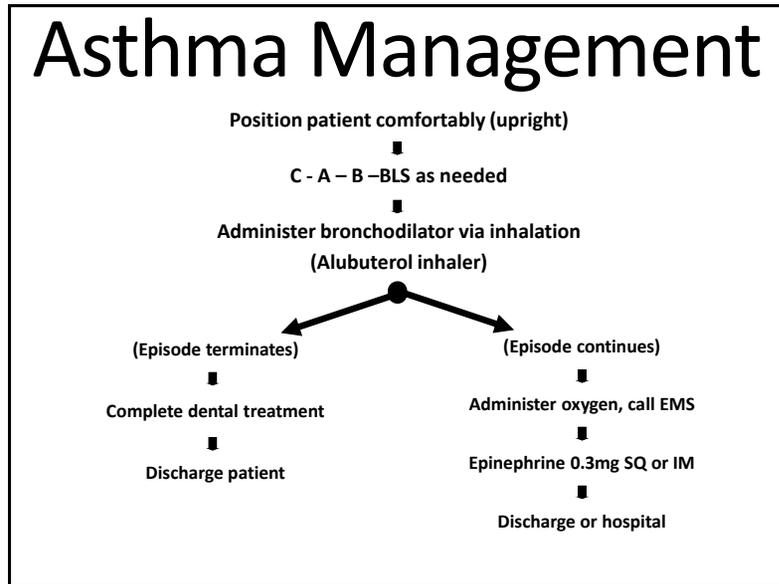


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Asthma Indicators of a Severe Attack

- SaO₂ (pulse oximeter) is below 91%
- Bronchodilator doesn't improve Sx after two treatments
- Patient has difficulty speaking
 - Sentences < phrases < words < mute
- Patient is struggling for air

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