Medical Emergencies in the Dental Office, Medical Emergencies in Life!

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Reality of Dental Emergencies

Almost Always

Almost Never
The Challenge

How can we as health professionals, who are supposed to have higher skills, be expected to treat an emergency situation in the office or in life when they NEVER (well, almost never) occur?
What today is NOT:
Are we facing an . . . .

INCONVENIENCE?

URGENCY?

EMERGENCY?

RARITY?
# Inconveniences

<table>
<thead>
<tr>
<th>Condition</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope</td>
<td>15,407</td>
</tr>
<tr>
<td>Mild Allergy</td>
<td>2,583</td>
</tr>
<tr>
<td>Postural Hypotension</td>
<td>2,475</td>
</tr>
<tr>
<td>Bronchospasm (asthma)</td>
<td>1,392</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>1,326</td>
</tr>
<tr>
<td>Epinephrine Reaction</td>
<td>913</td>
</tr>
</tbody>
</table>

Martin & Ellis JADA 112:499-501, Malamed JADA 124:4-53 >30,000 events
<table>
<thead>
<tr>
<th>Urgencies</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Syncope</td>
<td>15,407</td>
</tr>
<tr>
<td>Angina</td>
<td>2,552</td>
</tr>
<tr>
<td>Seizure</td>
<td>1,595</td>
</tr>
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</tr>
<tr>
<td>Epinephrine Reaction</td>
<td>913</td>
</tr>
<tr>
<td>Insulin Shock (conscious)</td>
<td>890</td>
</tr>
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Martin & Ellis JADA 112:499-501, Malamed JADA 124:4-53  >30,000 events
# Emergencies

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</tr>
<tr>
<td>Myocardial Infarction</td>
<td>289</td>
</tr>
<tr>
<td>Local Anesthetic Overdose</td>
<td>204</td>
</tr>
<tr>
<td>C.V.A.</td>
<td>68</td>
</tr>
</tbody>
</table>

Martin & Ellis JADA 112:499-501, Malamed JADA 124:4-53  >30,000 events
## Rarity ("Non" Events)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Pulmonary Edema</td>
<td>141</td>
</tr>
<tr>
<td>Diabetic Coma</td>
<td>105</td>
</tr>
<tr>
<td>Adrenal Insufficiency</td>
<td>25</td>
</tr>
<tr>
<td>Thyroid Storm</td>
<td>4</td>
</tr>
</tbody>
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Martin & Ellis JADA 112:499-501, Malamed JADA 124:4-53  >30,000 events
## “What’s Really Important?”

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<tr>
<td>Myocardial Infarction</td>
<td>289</td>
</tr>
<tr>
<td>Cardiac Arrest</td>
<td>???</td>
</tr>
<tr>
<td>Asthma, Severe Allergy → Bronchospasm</td>
<td>1,392</td>
</tr>
</tbody>
</table>
# Everything Else Has Time!

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic Coma/Insulin Shock</td>
<td>Sugar</td>
</tr>
<tr>
<td>Epilepsy/Seizure/Convulsions</td>
<td>Airway</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>O₂ Sat?</td>
</tr>
<tr>
<td>Mild Allergy Itchiness/Rash</td>
<td>100%</td>
</tr>
<tr>
<td>Local Anesthetic / Epinephrine</td>
<td>Wait</td>
</tr>
<tr>
<td></td>
<td>β Blockers</td>
</tr>
</tbody>
</table>
WHAT TODAY IS:

1. Protocols, Age/Risk Dynamics, Children
2. Airway + a few good adjuncts, Oxygen
3. Defib, Drugs, Diagnosis
Protocols,
Age/Risk Pharmacodynamics
Children
Emergency Protocol

Is 911 a false sense of security?

IT DEPENDS on:
• What,
• When, and
• Where the problem is!
Emergency Protocols

YES  911 is a solution.

Problem  What to do in the meantime???
Communication

• Front Desk
• Office Manager
“What is your Emergency?”

The 3 U’s

Unconscious

Unresponsive

Unable to find a pulse
RESPONSIBILITIES

Attending person ➔ 911

“I HAVE AN UNRESPONSIVE CHILD WITHOUT A PULSE.
123 Home Street at Lawn Blvd.,
Hawkins residence.
Front door.
I will meet you there.”
Front Desk ➔ 911

"WE HAVE A PATIENT IN CARDIAC ARREST WITH "CPR" IN PROGRESS
91 Rylander Blvd.
Dr. Hawkins office.
Front parking lot.
I will meet you there."
All the staff must know the location of:

- Portable oxygen with masks/cannulas
- BVM Ambu® bag with airways
- A.E.D.
- Emergency drug kit
- Portable suction
- Emergency lighting source
Staff Training

• Current **BLS** training
• **Task** designation: 2 groups, action + support
• **Mock** simulations:
  → shorter time (15 min.)
  → higher frequency (2 mo.)
  → repetition, repetition, repetition
Staff Training

Recommendation:
Can you discover, privately, without embarrassment who is and who may not be prepared for an assigned duty before an event, not during.
Mock Simulations

Every 2 Months: Syncope

for 15 Minutes: Syncope
Syncope Algorithm

Position, ABC's

Time, Time, Time

Always!

$O_2$ by nasal cannula

4 litres/minute

+ Glucose
Hey **Doc**, how do I treat your medically compromised patient?
MUST HAVE A GAME PLAN!

1. Dental treatment – risk/benefit
2. Contemplated medications in mg. or µg.

MD scrawling “BP is 240/120 but fine for dental treatment” on Rx pad is NOT a mandate!
EMERGENCY KITS

Ready made?

Self assembled?

Acme™ Dental / Medical Kit
IN OLD DAYS: nice suitcase and color coded microprint
PHARMACODYNAMICS: AGE AND RISK
Why does Morbidity – Mortality “target” CHILDREN?
Although inaccurate, a “child” in our society is usually defined as up to 12 years old.

A “bad day” will usually happen because of lack of respect of their airway...
Pediatric Considerations

C.V.S / C.N.S:

THE 2 MOST IMPORTANT Physiological Considerations IN PEDIATRIC RESCUE are:

- High MYOCARDIAL O₂ Consumption
- High BRAIN O₂ Consumption
C.N.S:
The CPR / BLS guideline of:

“3 – 6 minutes until permanent brain damage begins” is for the adult without an O₂ debt and does **NOT** apply in pediatric life.”

IT’S MORE IN THE ORDER OF 1 MINUTE!
Pediatric Considerations

Drug (local anesthetic) impact:

• Unpredictable

• Blood Brain Barrier \textit{is immature}

• \textless Metabolism due to \textit{immature liver}
Pediatric Considerations

COMMUNICATION DIFFICULTIES
Airway,

A Few Good Adjuncts,

Oxygen
MANAGEMENT OF AIRWAY

Actions & Armamentarium
Airway Obstructions: The Conscious Victim
Airway Considerations

• Know Each Patient’s Airway
• Always Maintain Patency
• Head Position
• Clear Debris
• Use Throat Partitions
• Use Rubber Dam When Possible
“Mouth Rester”... not a prop
Magill Forceps

Serated, circular tips, double lumen
Airway Obstructions: The Unconscious Victim
Oral Pharyngeal Airway

Size? Angle of Mandible to Corner of Mouth
STARTING POSITION

Airway is inserted backwards...

and rotated into position
MANAGEMENT OF BREATHING

Actions & Armamentarium
Flow meter:
0-15 liters/min
Full: 2000 PSI
Nasal Cannula - Disposable

O₂

4 l/min
These 2 digits press

These 3 fingers pull up
Defibrillation, Drugs and Diagnosis
CARDIAC ARREST
MONITOR THE VITAL SIGNS

Pulse
Pupils
Breathing
CONSTRUCTED

DILATED

(a)
Victim Must Be On “Firm” Surface ???
A “Firm” Surface IS the dental chair!

Head tilt/jaw thrust – pupil assessment easier
Suction from DA’s side
Access both sides
Decrease risk of dropping
  - injury head/neck
Stretcher height level with victim
N₂O/O₂ capability at head end
Chair tilt-legs elevated
Well lit for paramedic’s –
  - IV start, B.P. + monitor incl. AED positioning
Resusitation: Floor Resusci-Anne (n = 50)
Dental Chair Resusitation
Resusci-Anne (n = 50)

A.E.Ds

One-Touch

$1245.00

CPR Savers and First Aid Supply®
A.E.Ds

• An AED cannot accidently shock a non-shockable rhythm
• Only ventricular fibrillation and ventricular tachycardia can be converted
• A flat line will be not respond. However, 1 mg. epinephrine MAY render the myocardium more amenable to shock
• The operator cannot shock themselves but surrounding persons must stand clear!
AED Philosophy

• If you are required by your Provincial licencing body or

• If you think that you might need one used on you, then get one.

• If none of above apply, then don’t!
AED + ECG

Simple but Sophisticated

$1999.00

CPR Savers and First Aid Supply®
Let’s Do Drugs
Drugs

1. Oxygen
2. Epinephrine
3. Nitroglycerin
4. ASA – aspirin
5. Albuterol, Ventolin®
6. Diphenhydramine, Benadryl®
7. Glucose
What do you need?

DO NOT even *THINK* of using a drug you know nothing about!
Emergency Medications
Responsible Auxiliary:

• Check kit every two months (on mock simulation day) to assure drugs are not expired or broken. Replace as needed.

• Review correct method for preparation in emergency periodically.
OXYGEN
Epinephrine

EPIPEN®* for anaphylaxis (severe allergy; bee stings, peanuts) and bronchospasm

CHILD / ADULT: EpiPen 2-Pak®:
child: 0.15 mg….. $279.06
adult: 0.3 mg…. $ 279.06

*until you can draw up from an amp.
Epinephrine

Equi-potent doses: (1ml 1:1000 amps) by route of administration:

- SC - 0.5 mg
- IM - 0.3 mg
- IL - 0.2 mg
- IV - 0.1 mg. - must dilute 1:10,000

If patient has air exchange:
β-2 inhaler: salbutamol (Ventolin®)
Nitroglycerin

**Action is unclear:** SL administration $\Rightarrow$ vasodilation result in a reduced venous return, or preload reduction, lowering myocardial $O_2$ consumption.

**Indications:** Ischemic chest pain - 1 tab Q5M x 3
Symptomatic hypertensive episodes

**Dose:** 0.3-0.6 SL mg. tabs / 0.4-0.8 SL spray

**Warning:** do not give another “nitro” if SBP < 90
$9.00 / 100

Expiration date must be “Sharpied” to 8-10 weeks from “today’s seal breaking”
$32.00

Nitrolingual® Pumpspray

but . . .

. . . expiry date IS the expiry date
ASA

Giving the maximum as a 325 mg. tablet is OK but...
ASA (for MI)

325 mg. = peak effect

It’s best via 4X baby ASA (81 mg.) chewed, aside from, and over and above prophylactic use
ASA (for MI)

325 mg. = peak effect

Action: Keeps # of platelets from increasing, which could lead to further coronary artery blockage or if cerebral blockage, STROKE!
Ventolin®

Salbutamol / albuterol
Bronchodilator

**Inhaler:** Inhale 1 to 2 puffs of albuterol up to 4 times daily.

More than 8 inhalations per day is not recommended.
salbutamol/albuterol
Ventolin®
β2 agonist
Diphenhydramine (Benadryl®)

• Action and effect based on blocking histamine release

• Indications / Dose: (50mg/ml amp or SDV)
  • pruritus / urticaria / nausea
  • 50mg IM followed by 50mg TID P.O.
  • medical follow up to anaphylaxis

• THINK FIRST! Can they get a ride?
Glucose Source

ALL dental offices have a massive sugar availability in house!
Resources for Emergency Drugs and Equipment

Sedation Resource, Inc

texasrose@sedationresource.com
www.sedationresource.com
800-753-6376

Hals Med Dent Supply & Pharmacy, Inc
www.halsmeddent.com

Southern Anesthesia & Surgical
www.southernanesthesiainc.com
Resources for Emergency Drugs and Equipment

ACE Surgical Supply Company
1034 Pearl St. Brockton, MA

AAMOS Supplier Marketplace
aaoms@multiview.com
www.multiview.com 800-816-6710

Salvin Dental Specialties, Inc.
Criticare monitors, AED’s,
3450 Latrobe Dr. NC 28211
www.salvin.com
Syncope

- Sudden, transient loss of consciousness
- Common immediately pre- or post injection
- Most common procedure – extraction
- Often recovery before advanced treatment can be implemented
Syncope Profile of Prevalence

• Male » Female
• Never in children
• Average age? 35 years old
• Scenario:
  Male, 35 y.o., anxious, “macho” guy, “needlephobic”
Syncope – Signs / Symptoms

- Pallor
- Nausea
- Disorientation
- Loss of Consciousness
- **Blood pressure**
- Pulse thready, may arrest 30-45 sec.
- Low blood sugar
Syncope Causes

- Anxiety, Pain
- Sit up too fast
- Inject too fast
- Intraosseous injections
- Hypoglycemia (prolonged NPO)
Syncope Algorithm

Position, ABC’s

Time, Time, Time

*Always!*

$O_2$ by nasal cannula

4 litres/minute

+ Glucose
ACUTE ASTHMA,

SEVERE ALLERGY,

BRONCHOSPASM
Bronchospasm Algorithm

ABC’s & Position

↓

Oxygen

↓

B-2 inhaler

BUT if not exchanging air:
epinephrine 0.3 mg
Hyperventilation

Signs / Symptoms:

• Rapid, shallow breaths, “air hunger”
• Impaired inspiration / expiration
• Sense of panic
• Disorientation

• \( O_2 \) saturation = 100%
Hyperventilation

It’s Showtime!
Hyperventilation Treatment

• Rebreathe from paper bag?
• Do nothing and leave room

*Nobody has ever died from a 100% oxygen saturation!
Angina

• Pallor, chest pain in “waves”
• “Indigestion?”
• Denial
• Midsternal pain, left arm, left mandible
• Nausea, diaphoresis
• Rapid, shallow breathing,
• Rx - administer 1 nitroglycerine
Myocardial Infarction

• **Female:** “weight on chest” / indigestion?
• mild shortness of breath (SOB), nausea

• **Male:** chest pain, sharp, severe, left arm
• ↑ SOB, ↑ BP (pain)
• Panic, fear, but denial
• Rapid, shallow breathing
Syncope Protocol

Nitroglycerin  q. 5 min x 3

Assume MI / Call EMS
Cardiac Arrest

• Marked hypotension
• Rapid, shallow breathing ⇒ LOC
• Apnea ⇒ cyanosis = respiratory arrest
• Fibrillation = no pulse
• AED gives diagnosis and action
Cardiac Arrest Algorithm

Syncope Protocol

100% Oxygen

⇒ 1 - 2 mg epinephrine
Diabetic Emergencies

ALWAYS (almost) is INSULIN SHOCK, = SIGNIFICANT HYPOGLYCEMIA:

• Thirst
• The “6 black coffee” syndrome
• Shakes, diaphoresis, pallor
• Confusion, restlessness
• “I feel faint” ⇒ unconsciousness
Hypo(er)glycemia Algorithm

ABC’s & Position

↓

Oxygen

↓

Glucose
In The Dental Office or
Witnessed at home

- Primary assessment is in front of you or in the history
- Activate EMS, 911
- Assign, Designate

It is still A, B, C
Unexplained, Unwitnessed, Unconscious

• Primary assessment

• Call for HELP, get to a phone even if it’s you that has to leave

• No medical history, no relatives, no knowledgeable friends

Cardiac arrest NOW C, A, B
IN LIFE...triple “U”

• Look for MEDIC ALERT bracelet or necklace

• Read allergies, medical conditions

• Phone emergency hot line # on MEDICAL ALERT tag, quote victim’s ID #

• Medical history will be given 24 / 7 by phone
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