



Medical Emergencies in the Dental Clinic

Rapid Response Guide

January 2008

Asthma

Causes

- Inflammation of the lower respiratory tract and contraction of the bronchial smooth muscle

Signs and Symptoms

- Wheezing when exhaling, coughing, shortness of breath

Treatment Precautions

- **Make sure patient has their medication with them at time of appointment**
- Use rubber dam only if patients nose and sinuses are clear
- For controlled asthmatics, LA with EPI should be used judiciously (no more than 2 carpules) – this is because the sulphite used as a preservative may bring about an allergic attack
- Try to keep appointments as stress free as possible
- Agree on a signal for distress with patient before beginning treatment
- Avoid ASA – acetylsalicylic Acid (Aspirin) or NSAIDS (Non-steroidal anti-inflammatory drugs such as Ibuprofen, Naproxen etc.)

Treatment

- Have patient signal you that they need their medication
- Have patient administer their own medication
- Administer O₂ if deemed necessary

ASTHMA

Epileptic Seizures

Causes

- Seizures are caused by a temporary abnormal electrical activity in a group of brain cells

Signs and Symptoms

- Patient may have a previous history of seizures
- Patient may recognise they are coming by a preceding “aura”
- Altered consciousness levels
- Muscle rigidity
- Convulsions
- Apnea (temporary absence or cessation of breathing)
- Cyanosis (a bluish or purplish discoloration (as of skin) due to deficient oxygenation of the blood)

Treatment Precautions

- If patient usually recognises when seizures are about to happen discuss a signal they can give you about an impending seizure
- Make sure patient has taken their medication that day
- Book appointments within hours of taking medication
- Have O₂ ready
- Be prepared to remove clamp, rubber dam etc. quickly

Treatment

- Place patient on his side on the floor away from objects until seizure subsides
- If patient vomits, suction
- If seizure lasts longer than 5 minutes, call EMS
- Administer O₂ if deemed necessary

EPILEPSY

Anaphylactic shock

Causes

- A severe allergic reaction

Signs and Symptoms

- Respiratory distress, wheezing
- Airway obstruction
- Rapid, weak pulse
- Palpitations
- Swelling of lips or eyelids, eyelids may itch and tear
- Difficulty swallowing
- Nausea and vomiting
- Abdominal pain
- Urticaria (hives)

Treatment Precautions

- Always perform a complete medical history to reduce the likelihood of an allergen exposure
- If patient usually carries an Epi-Pen make sure they have it with them at time of appointment

Treatment

- Call EMS immediately
- Administer epinephrine (if patient carries epi-pen)
- If patient is conscious give dose of Benadryl*
- If pulse present, elevate legs, give O₂
- If no pulse or breathing, begin CPR
- If patient vomits, suction
- Continue CPR or monitor vital signs until EMS arrives

*Benadryl Dosages

Adult Benadryl liquid contains 12.5 mg diphenhydramine/5ml

Weight	Dose of diphenhydramine
10 kg and over	12.5-25mg (5-10ml)
Adult	25-50mg (10-20ml)

ANAPHYLAXIS

Syncope (fainting)

- The most common type of emergency in the dental clinic
- Temporary loss of consciousness with inability to maintain postural control

Causes

- Fear, pain or stress
- Fatigue
- Hunger
- Overly warm environment
- Decreased blood flow to the brain – may be caused by lying head down for extended periods of time and getting up too quickly, as in the dental chair

Signs and Symptoms

- Restlessness
- Pallor
- Feeling “too warm”
- Cold sweats, clammy skin
- Nausea, generally feeling unwell
- Breathing may be irregular or cease
- Slow feeble pulse
- Convulsive movements, twitching
- Loss of consciousness

Treatment

- Lay patient in a horizontal “head below feet” position
- Loosen tight clothing
- Place cold towel on forehead
- Monitor ABC’s (airway, breathing, circulation)
- Give O₂
- Consider oral glucose in conscious patients in diabetic patients who are conscious and able to swallow well

SYNCOPE (FAINTING)

Diabetes

- Elevated glucose levels in blood and urine. Persons diagnosed with Diabetes may suffer from too high or too low blood sugar at times depending on medication, food intake, illness or stress.

*** NEVER TREAT AN UNCONTROLLED DIABETIC**

Signs and Symptoms

Hypoglycemia (low blood sugar)

- **Rapid onset – within minutes (can be fatal)**
- Nervousness
- Pallor
- Weak, dizzy
- Hunger, nausea
- Mental confusion
- Lethargy or belligerence
- Decreased rate of breathing
- Increased heart rate
- Decrease in blood pressure
- Seizures
- Tingling sensation in legs feet or hands
- Loss of consciousness, coma

Hyperglycemia (elevated blood sugar)

- **Slow onset – hours or days**
- Hot, dry
- Flushes malaise
- Nausea vomiting
- Stupor
- Drowsy
- Irritability
- Headache
- Acetone odour
- Decreased rate of breathing
- Increased heart rate
- Decrease in blood pressure

Treatment Precautions

- Ensure patients has eaten and has had their medication before the appointment
- Try to schedule morning appointments
- Keep appointments short
- Have sugar containing beverage on hand

Treatment

- If conscious and able to swallow well, give 4oz. of juice to drink. Call EMS if patient doesn't feel better in 15 minutes or becomes unconscious
- If unconscious call EMS immediately

DIABETES

Local Anaesthetic Dosage

Lignospan Standard (Lidocaine Hydrochloride 2% and 1:100,000 Epinephrine)

1.8 ml carpule = 36 mg Lidocaine Hydrochloride

Maximum Dose of Lidocaine for Children and Adults

- **4.4 mg of lidocaine/kg body weight**
- To change lbs into kg, divide patient's weight in lbs by 2.2 = kg
- multiply weight in kg x 4.4 (max. dose per kg) = maximum carpules
36mg

Example:

- 60 lb child = 27kg body weight
- $27 \times 4.4 = 118$
- $\frac{118}{36} = 3$ carpules maximum

Local Anaesthetic Dosage by Body Weight (Lignospan Standard)		
Weight (kg)	Lidocaine (mg)	Maximum Carpule
10	36	1
20	72	2
30	108	3.5
40	144	4.5
50	180	5
60	180	5
70	180	5
80	180	5
90	180	5
100	180	5

* Do not exceed total of 180mg (5 carpules)

LOCAL ANAESTHETIC DOSAGE

What to do in an Emergency

RCMP: _____

Hospital: _____

Ambulance/EMS: _____

Fire Department: _____

Poison Control: _____

* Each clinic will record the appropriate local phone numbers above and update this list annually

In the case of a medical emergency in the dental clinic

- The **Dental Assistant/Aide** will
 - call EMS
 - bring emergency kit and oxygen
 - assist with CPR as required

- The **Dental Therapist** will
 - direct staff
 - stay with the patient
 - assess the patient's condition
 - maintain ABC's (airway, breathing, circulation)
 - initiate any emergency treatment needed until EMS arrives

WHAT TO DO IN AN EMERGENCY

Monitoring Vital Signs

Expected Normal Ranges

	Pulse (beats/min)	Breaths (breaths/min)
Baby	70-190	30-40
preschool	80-130	23-30
6 yr old	75-115	21-26
8-10	70-110*	20-26
12-14	65-105*	18-22
16-18	55-95*	16-20
adult	60-100	10-20
	*teenage females may be slightly higher	

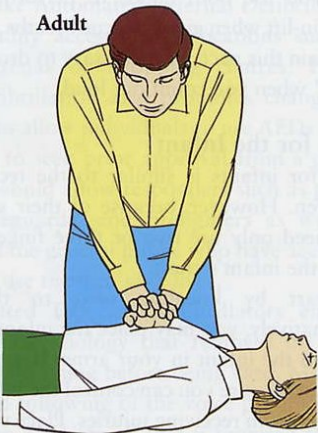


*Adapted from Physical Examination and Health Assessment 2nd Edition

Cardio Pulmonary Resuscitation (CPR)

CPR steps

1. **Begin EMS**
 - Take charge
 - Call out for help
 - Make the area safe; wear gloves
 - Determine what happened
 - Identify yourself and offer to help
2. **Assess responsiveness**
 - Shout and gently tap/shake
3. **Phone your emergency response number**
 - If patient is a child, phone your emergency response number **after** giving 5 sets of 30 compressions and 2 breaths
4. **Open airway**
 - Tilt the head back, lift chin
 - If patient is not breathing, give 2 breaths that make the chest rise.
5. **Check breathing**
 - Look, listen and feel for no more than 10 seconds
 - If patient is not breathing, continue with next steps
6. **Give 2 slow breaths**
 - Use face shield/mask
 - Check for chest movement
7. **Begin chest compressions**
 - Landmark for hand position
 - Give chest 30 compressions / 2 breaths at a rate of 100/minute
8. **Continue until medical help arrives**

CPR

	Adult	Child 1-8	Infant 0-12mos
	 <p>Adult</p>	 <p>Child</p>	 <p>Infant</p>
HAND POSITION:	Two hands on center of chest between nipples	One or two hands on center of chest between nipples	Two fingers just below the nipple line
COMPRESS:	1 ½ - 2 in.	1/3 to 1/2 depth of chest	
BREATHE:	Slowly Until chest rises (2 seconds per breath)	Slowly Until chest rises (1-1.5 seconds per breath)	Slowly Until chest rises (1-1.5 seconds per breath)
CYCLE:	30 compressions 2 breaths		
COMPRESSION RATE:	100 Compressions per minute		

* Heart and Stroke foundation of Canada - 2007

Oxygen Unit Operation

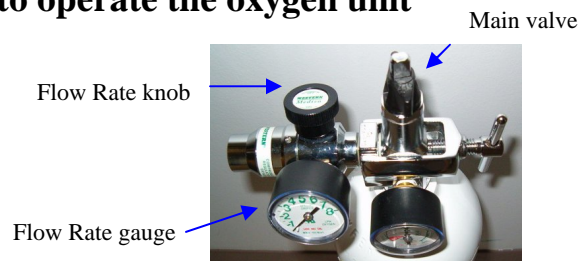
Indications for Use of Oxygen

- Respiratory Arrest or difficulty
- Cardiac Arrest
- Airway obstruction
- Shock
- Seizures
- Diabetic hypoglycaemia
- Major blood loss

DO NOT withhold O₂ from a patient with inadequate breathing or respiratory distress.

How to operate the oxygen unit

- Connect appropriate mask
- Turn on main valve
- Adjust flow rate knob according to chart below



Oxygen Delivery

	Flow Rate (litres/min)	O ₂ Delivery
Nasal Cannula	2-6 l/min	24%-44%
Simple Mask	6-10 l/min	40%-60%
Non- Rebreather*	10-15 l/min	80%-95%

Flow Rate Formula (how many minutes the tank will last)

$$\frac{(\text{gauge pressure/psi} - 200) \times \text{constant}}{\text{flow rate l/min}} = \# \text{ of minutes tank will last at that flow rate}$$

Constants used in formula (depend on the type of tank)

D cylinder = 0.16 E cylinder = 0.28

Example: D tank with 2000 psi at a rate of 10 litres/min will last 28.8 minutes

$$\frac{(2000-200) \times .16}{10} = 28.8$$

References

- The National School of Dental Therapy, Medical Evaluation Course notes 2002
- Mamawetan Churchill River Dental Program Policy Manual, 2007
- Saskatoon Health Region, Dental Program and Policy Manual, 2006
- The American Pharmaceutical Association Drug Information Handbook, 1993
- Handbook of Local Anaesthesia, 4th Edition, Stanley F. Malamed
- Bailliere's Nurses dictionary, Weller and Wells, 21st edition
- Mosby's Dental Drug Reference, 6th edition
- Physical Examination and Health Assessment, 2nd edition
- Heart and Stroke Foundation of Canada, 2007
- "Oxygen Indications and Use", course notes, NITHA workshop Feb 2007

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