

New Zealand Code of Practice Medical Emergencies in Dental Practice

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CODE OF PRACTICE

1. INTRODUCTION

Studies have shown that medical emergencies do occur in the dental practice¹. Dental practitioners and their staff need to have appropriate skills, training and equipment available to deal with potentially life threatening conditions^{1,2}.

The New Zealand Resuscitation Council has published national guidelines with graduated levels for training and management of common life threatening conditions. These guidelines are for all health professionals.

Dental practitioners must be adequately prepared and equipped to deal with these common life threatening conditions. They must have completed training to a level equivalent to the NZRC Certificate of Resuscitation and Emergency Care (CORE) Level 4. CORE 4 is also suitable for dental surgery and receptionists for whom the CORE 4 final practical and written assessments are optional. This training must be revalidated every four years.

Dentists practising techniques of sedation should have training commensurate with the risk involved. A CORE 4 certificate is regarded as the minimum acceptable level of certification, revalidated every four years. Sedation practitioners are encouraged however to attain a higher skill level where possible because of the possible need for advanced airway control (preferably Level 6 CORE). Practitioners attending CORE 4 courses should request that the instructor provide them practice in the technique of endotracheal intubation in addition to the basic CORE 4 curriculum.

Up-to-date drugs and equipment, as listed in this code, must be operational and readily available in all dental practices.

Survival from cardiac arrest with Ventricular Fibrillation is dependent on early defibrillation. 50% of cardiac arrests following myocardial infarction occur in the first 15-30 minutes. Defibrillation applied immediately following collapse will be successful in 80% of cases, but success declines by 10% for every minute delay. It may not be practical at present for dental practitioners to carry an automated external defibrillator (AED). Dental practitioners may however wish to carry AED devices to help improve community availability to early defibrillation.

2. PREPARATION FOR EMERGENCIES

a. Prevention

A comprehensive medical history must be recorded for all patients. This medical history form must be updated regularly. An assessment should be

undertaken for patients with unstable or severe medical conditions as to their suitability for management in general dental practice. Patients with severe or unstable medical conditions should be referred for treatment in hospital dental clinics.

b. Training

All staff in the dental practice should have appropriate training: dental practitioners, Level 4 New Zealand Resuscitation Council Certificate of Resuscitation and Emergency Care (CORE) or equivalent; dental surgery assistants, reception and other staff, attendance at a Level 4 course with optional assessment of practical and theoretical skills. Those not completing formal assessment will require an NZRC letter of attendance. A team approach to management of medical emergencies should be developed. Protocols should be in place so that all staff members know their role in managing emergency situations. The dental team should regularly practice scenarios within the dental practice setting.

c. Equipment and Drugs.

Drugs must be readily available and up-to-date. They should be stored to facilitate easy identification. Emergency equipment must be readily available. The equipment must be checked frequently to make sure it is operational.

3. EQUIPMENT

The following equipment must be carried and be readily available in dental practices:

- Oxygen cylinder and regulator suitable for delivering high flow oxygen
- Syringes and needles for drawing up and administering drugs
- Bag mask device with oxygen reservoir
- Basic airway adjuncts (oro-pharyngeal and naso-pharyngeal airways)
- Equipment for recording blood pressure
- Automatic external defibrillator (presently recommended not mandatory)
- Spacer device to deliver Salbutamol
- Paper bag

4. DRUGS

- Oxygen
- Adrenaline (1:1000, 1:10000)
- GTN spray or tablets
- Aspirin tablets
- Salbutamol inhaler
- Prednisone tablets

5. INTRAVENOUS SEDATION

A more complete range of equipment and drugs is required in practices where intravenous sedation procedures are performed. Further information regarding safe use of IV sedation within dental practice is contained within the NZDA Code of Practice Sedation in Dental Procedures.

Equipment

- IV cannulae (including large bore 14g,16g)
- Tourniquet
- Alcohol swabs, tape
- Nebulisor to deliver Salbutamol or adrenaline
- Advanced airway adjuncts (LMA + endotracheal tubes)

Drugs for use by sedation practitioners trained to CORE 6

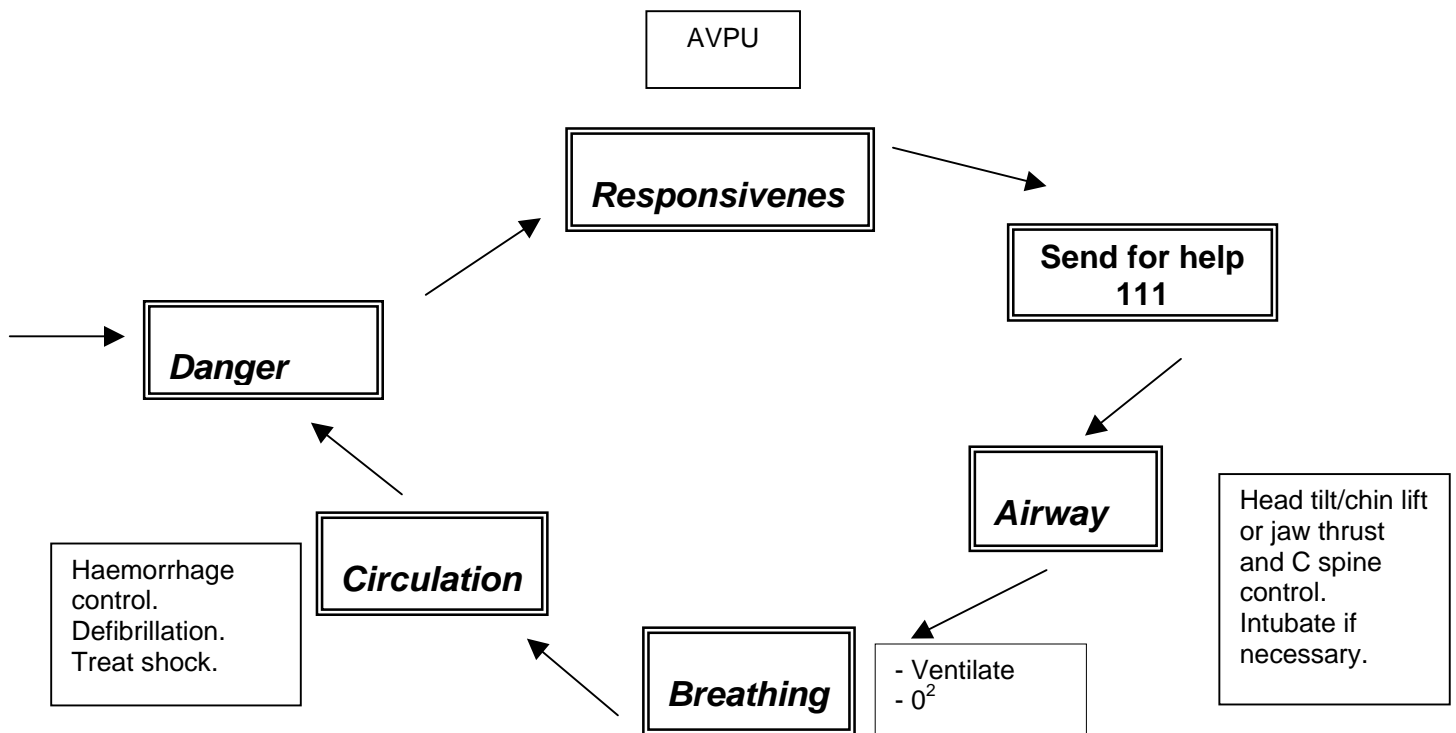
- Naloxone
- Flumazenil
- Dextrose 20%
- Glucagon
- Normal saline 1000 ml
- Haemaccel 500 ml (or other colloid solution)
- Salbutamol
- Hydrocortisone
- Promethazine
- Midazolam
- Practitioners with manual defibrillation could carry Amiodarone and Atropine optionally.

MEDICAL EMERGENCIES - INFORMATION

1. GENERIC RESPONSE TO THE UNCONSCIOUS PATIENT

Initial assessment and management of an unconscious/collapsed patient follows a similar pattern despite the diversity of possible causes. Unconsciousness can be caused by deterioration of medical conditions, drug administration or trauma. The following algorithm is a guide which can be followed in clinical practice and community settings. The general dentist may be called upon to assist or manage resuscitation in the community e.g. cardiac arrest, motor vehicle accident. Whenever you recognise that a serious medical emergency exists, always go through six steps of DRS-ABC. No other aspect of emergency care is as important.

Drs-ABC



Danger - Ensure your safety and then safety of patient. The patient/victim may need to be moved.

Responsiveness - The most important assessment that decides much of your following actions is a simple tap or shake and a command “**are you okay?**” This will quickly tell you whether the person’s life is in immediate danger. A casualty

who can respond with a few words has an airway, can breath and has a circulation. A person who is unresponsive may have none and is at risk of aspiration and airway obstruction. Keep in mind a simple assessment of level of consciousness.

AVPU

A=Alert,
V=response to verbal stimulus,
P=response to pain,
U=unresponsive.

Send - an assistant for help (111). Ask them to then return and confirm the ambulance is on its way.

Airway – Open the airway by head tilt and chin lift. If the casualty is a victim of trauma, then the cervical spine may be damaged, use jaw thrust to open the airway and hold the head to keep the head and neck still and in alignment with the rest of the body.

Breathing - The breathing must be assessed quickly. If there is no breathing, start rescue breathing. Consider intubation to protect the airway. If the breathing is inadequate, the rescuer may need to give assisted rescue breathing. The breathing check will also indicate any difficulty with breathing from asthma, heart disease, anaphylaxis.

Circulation – Assess quickly and if there is no circulation chest compressions must be started immediately. If there is bleeding use direct compression to stop further blood loss. Once Drs ABC have been assessed and secured, give consideration to other aspects of emergency care and positioning of the patient/victim. Some patients may deteriorate after the initial assessment. It is therefore best to consider **DRS-ABC as a cycle**, performed regularly while awaiting the ambulance.

2. ADULT COLLAPSE

Many conditions present an immediate threat to life. Almost all of these conditions do so by preventing circulation and/or oxygenation. The practice of resuscitation is focused on the restoration and maintenance of circulation and oxygenation.

The sequence of actions for the New Zealand Resuscitation Guidelines for Adult Collapse (Level 4) is summarised as follows:

- Ensure your own safety and then ensure the victim is out of further danger.
- Check responsiveness. Gently stimulate the victim and shout, “Are you all

right?”

- **Send or shout for help.**
- Open the airway with chin lift, head tilt or jaw thrust. Remove obvious causes of airway obstruction.
- Within 20 seconds check for breathing and assess for signs of circulation. Feel the carotid pulse while looking for other signs of life, movement or breathing.
- If circulation is absent, the onset of arrest occurred within two minutes, a defibrillator is not immediately available and chest compressions have not already been started, give a single precordial thump.
- **Go for help if no help is available.**
- Give two effective breaths, sufficient to make the chest rise and fall. Make up to five attempts to deliver these breaths.
- Position hands over the junction of the lower and middle third of the sternum. **Compress the chest at a rate of 100 per minute.** Depth of compression is 4-5cm. Both single and double rescuers should deliver cycles of 15 compressions, followed by two attempted breaths.
- **Ratio of compressions to breaths 15:2.**
- Every three minutes reassess the circulation. If an AED is available, this should be utilised.
- If the AED indicates “Shock advised”, ask other rescuers to stand back and follow the device instructions. Sequences of three shocks will generally be delivered, unless a non-shockable rhythm results from one of the defibrillations. If, after a defibrillating shock, the AED indicates “No shock advised”, reassess the circulation.
- If the AED indicates “No shock advised”, in the absence of a circulation, perform CPR and reassess the circulation/rhythm every three minutes.
- Consider the possible causes and institute appropriate therapy.

3. CHILDHOOD COLLAPSE

Whereas in adults the focus is on early defibrillation, in children the focus is on early ventilation.

The sequence of actions for the New Zealand Resuscitation Council Guidelines for Infant and Child Collapse (Level 4) is summarised as follows:

- Ensure your own safety and ensure the victim is not in further danger.
- Assess responsiveness by speaking loudly or pinching gently. Do not shake a baby. If unresponsive, shout or send for help.

- Open the airway with head tilt (but avoid excessive extension) and chin lift. Use the jaw thrust manoeuvre if you suspect cervical trauma. Keep the mouth slightly open and remove any obvious cause of airway obstruction.
- Chest or abdomen moves but there is no breathing at the mouth, reattempt airway opening and consider foreign body obstruction.
- If the breathing is absent or inadequate, begin expire air ventilation giving five attempted breaths each lasting 1-1.5 seconds.
- For no more than 10 seconds check for presence of a circulation.
- If no circulation is present, if you are unsure, or in infants if the pulse rate is less than 60 per minute, start external **chest compressions at the rate of 100 compressions per minute.**
- **Ratio compressions to breaths for CPR in child, five compressions to one breath.**
- After one minute of CPR activate the emergency medical services if you are alone and have not already done so.
- Resume CPR as soon as possible.
- After every three minutes of CPR reassess the circulation.
- If an AED is available **and the child is over eight years of age**, immediately attach the electrodes to the victim's chest and assess the rhythm. Follow the standard AED protocol. Newer AED devices are available with attenuated pads that deliver 50J and can be used in children under eight years.
- If the AED indicates "No shock advised" in the absence of circulation, perform CPR and reassess the circulation/rhythm.
- Consider the possible causes and institute appropriate therapy.

4. EMERGENCY SITUATIONS : SPECIFIC RESPONSES

4.1 Anaphylaxis

Definition

A potentially life threatening immune reaction to foreign material.

Presentation

Urticaria, angioedema, hypotension, tachycardia, bronchospasm.

Management

Dependent on severity of presentation.

Assess the degree of cardiovascular collapse (pulse and blood pressure).

Assess the degree of airway obstruction (upper - angioedema, lower – bronchospasm).

- Stop administration of drug.

- Call for help (111).
- Patient supine.
- Pulse, BP.
- Assess breathing difficulty (stridor, wheeze, can't speak).
- Give O₂.
- Monitor consciousness, airway, breathing, circulation, pulse, blood pressure.
- If shocked, angioedema or bronchospasm:
 - Raise legs if low BP.
 - Adrenaline 0.5 ml, IM, 1:1000 = 0.5 mg immediately.
 - Repeat IM adrenaline every five minutes while waiting for ambulance.

4.2 Asthma

Most asthma-related deaths occur outside the hospital.

Management.

Assess severity.

- **Acute severe** - patient unable to speak in complete sentences, pulse rate greater than 110 per minute, respiratory rate greater than 45 per minute.
- **Life threatening asthma** – “Silent chest”, cyanosis, sweating, hypercarbic flush, bradycardia/hypertension, confusion, agitation.
- If more than one feature severe, or any life threatening, arrange hospital transfer; otherwise
 - High flow oxygen.
 - Salbutamol – one puff into large volume spacer and allow six breaths, - repeat x 6.
 - Prednisone 30-60 mg orally.
 - If not improving, arrange hospital transfer. Repeat spacer bronchodilator treatment every fifteen minutes while awaiting transfer.

4.3 Diabetes

The most common diabetic emergencies are:

- Low blood sugar – **hypoglycaemia** in patients on anti-diabetic medications.
- High blood sugar – **hyperglycaemia**, particularly diabetic ketoacidosis.

Hyperglycaemia

Clinical symptoms include thirst, increased urine output and dehydration. A progressive reduction in conscious level and hypotension, with coma and cessation of urine output in severe cases.

Management

Primary assessment and resuscitation (Drs-ABC) securing the airway, breathing and circulation.

Transport to a hospital facility.

Hypoglycaemia

Clinical symptoms of hypoglycaemia include sweating, hunger, tremor, agitation. With progression drowsiness, confusion and coma.

Assume any diabetic with impaired consciousness has hypoglycaemia until proven otherwise.

Management

Conscious patients can usually be treated with rapid acting oral carbohydrates, e.g. fruit juice, packets of granulated sugar, glucose powder neat or dissolved in water. After ten minutes this short acting carbohydrate should be followed up with food which contains longer acting carbohydrate. It is important that the victim is not left alone until all danger of hypoglycaemia has passed. If the patient is unconscious, attend to the airway, breathing and circulation. Protect the victim from injury and activate the EMS (dial 111).

4.4 Epilepsy

There are several types of epilepsy. In a major seizure there is a sudden spasm of muscles producing rigidity (tonic phase). Jerking movements of the head, arms and legs may occur (chronic clonic). The victim becomes unconscious and may have noisy or spasmodic breathing, salivation and urinary incontinence.

Status epilepticus occurs when a convulsion lasts longer than 30 minutes or when a tonic-chronic seizure occurs repeatedly.

Management

Remove dangerous objects from the mouth and around the patient, e.g. dental cart.

- Loosen tight clothing.
- Avoid restraining the patient.
- The mouth should not be forced open, nor attempts made to insert any object into the mouth.
- Turn the victim into a stable side position as soon as the seizure stops, open and maintain a clear airway and avoid aspiration.
- Check for breathing. If absent, follow the guidelines for collapse.

- Allow the victim to sleep under supervision at the end of the seizure.
- On recovery, give reassurance.
- Transfer to hospital if:
 - (i) First fit.
 - (ii) Tonic phase lasts longer than five minutes.
 - (iii) Repeat seizure.
 - (iv) Any post-seizure respiratory difficulty.
 - (v) Patient has suffered an injury.
 - (vi) Post-seizure confusion greater than five minutes.

4.5 Chest Pain / Myocardial Infarction

Victims usually begin with varying degrees of atheromatous coronary occlusion. Myocardial infarction is usually initiated by rupture or erosion of a thin cap which overlies these atheromatous plaques. Platelet adhesion and aggregation then occurs over the ruptured surface. The haemodynamic effects of this thrombus formation may lead to prolonged ischaemic symptoms and pain at rest. If the clot occludes the coronary artery a myocardial infarction occurs.

Symptoms and Signs

Persisting central chest pain, with possible radiation to the left or right arms, jaw, or neck.

- Pain is no longer improved with Glyceryl Trinitrate.
- Nausea, vomiting.
- A sense of impending doom.
- Restlessness.
- Shortness of breath.
- Pallor, cold sweaty skin.
- Pump failure: hypotension, raised venous pressure, tachycardia and possibly pulmonary oedema.

Management

If acute MI is suspected:

- Reassure the victim, keep them warm.
- Sit them up if breathless.
- Lie them flat if they are faint.
- Give GTN tablets or spray, one tablet chewed or one spray under the tongue.
- Repeat in five minutes, if pain unrelieved, activate EMS (dial 111).
- Give high flow oxygen by face mask.
- Give 300 mg Aspirin, chewed or sucked if patient not allergic.
- Continue monitoring level of consciousness and be prepared to initiate adult

collapse guidelines if patient becomes unconscious.

4.6 Foreign Body – Upper Airway Obstruction

Severe or complete upper airway obstruction due to a foreign body rapidly progresses to unconsciousness and cardiac arrest within minutes.

Presentation

- Distress.
- Choking, coughing.
- Stops breathing.
- Cyanosis.
- Loss of consciousness.

Management

i. Partial obstruction.

- Encourage patient to cough up or spit out. Initially do nothing else.
- If poor air entry, increasing high pitched stridor, increased respiratory distress, manage as for complete airway obstruction.

ii. Complete obstruction

- Victim cannot speak, breathe or cough.
- If patient is in the dental chair sit them up, turn patient side on in chair. Support chest with one hand and deliver five sharp back blows between the shoulder blades with the heel of the other hand.
- If back blows fail, five abdominal thrusts (Heimlich).

iii. Unconscious obstruction

- Commence CPR with finger sweep between each cycle.
- Consider cricothyroidotomy if no air entry.

4.7 Vasovagal Syncope

Usually defined as a transient loss of consciousness due to cerebral ischaemia caused by a reduction in blood supply to the brain. Vasodilatation causes pooling of blood in the peripheries and vagal stimulation causes slowing of the heart. This combination causes a dramatic fall in blood pressure.

Presentation

Patient feels light headed or dizzy, possibly nauseous, uncomfortable or agitated. They will appear pale and sweaty with a thready slow pulse and hypotension.

Management

Vasovagal syncope in a fit, healthy young patient:

- Lie the patient flat.
- Relieve any compression on the neck and maintain an airway.
- Raise patient's legs.
- Give supplemental oxygen.
- When consciousness is regained, patient should be kept flat and reassured.
- Once pulse and blood pressure recover, slowly raise patient to seated position.

Patients with significant medical problems, or when syncope is prolonged or complicated by seizure activity, should be transferred to a hospital environment for further assessment as indicated.

4.8 Hyperventilation

Prolonged rapid deep breathing often in very anxious patients can lead to profound metabolic changes that may result in loss of consciousness. A fall in arterial CO₂ concentration causes cerebral vasoconstriction and respiratory alkalosis.

Presentation

The patient may notice tingling of the fingers or lips, tetanic spasm of the peripheries, and dizziness. These symptoms tend to increase an anxiety and respiratory rate and depth. Eventually the patient will become unconscious due to a relative cerebral hypoxia. The patient is apnoeic for a period due to reduced respiratory drive with low arterial CO₂ concentration. As the arterial CO₂ level rises and cerebral vasoconstriction reverses, the patient starts breathing and regains consciousness. Hyperventilation recommences and the cycle continues with further loss of consciousness.

Management

- Reassure patient.
- If conscious re-breath into paper bag to increase inspired CO₂.
- In unconscious maintain airway until patient regains consciousness.
- Place in stable side position and reassure patient while re-breathing into paper bag.

5. REFERENCES

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