

DIPLOMA OF PRIMARY CARE  
DENTISTRY

-RCSI-

PART – 1  
CLINICAL SKILLS

PART 9: EMERGENCIES IN DENTAL  
PRACTICES

## Useful emergency kit:

- Every practice should possess portable apparatus for delivering high-flow O<sub>2</sub>
  - In addition, the facility to deliver nitrous oxide and O<sub>2</sub> mixture, e.g. via an anaesthetic or relative analgesia machine, can be invaluable.
  - The following should be readily available:
    - ⊙ Automated external defibrillator.
    - ⊙ Basic set of oro-pharyngeal airways, with a self-inflating bag and mask system.
    - ⊙ Non-rebreathing oxygen mask with tubing.
    - ⊙ Pocket mask with oxygen port.
    - ⊙ Portable high-vacuum suction.
    - ⊙ 'Spacer' device for inhaled bronchodilators.
    - ⊙ Automated blood glucose measuring device.
    - ⊙ Disposable syringes (2mL, 5mL, and 10mL), needles (19G and 21G), and a tourniquet.
    - ⊙ Butterfly needles and IV cannulae are great assets to those familiar with their use.
    - ⊙ Alcohol wipes.
  - Drugs:
    - × Adrenaline, 1:1000 solution (1mg adrenaline in 1mL saline).
    - × Auto-injectors (0.3mg) often held by high-risk patients. Salbutamol aerosol inhaler (100 micrograms/actuation).
    - × Midazolam 10mg buccal.
    - × Oral glucose solution/tablets/gel/powder.
    - × Flumazenil 100 micrograms/mL 5mL ampoule (only if providing IV sedation).
    - × Glucagon 1mg IM injection.
    - × Aspirin dispersible (300mg).
    - × Glyceryl trinitrate (GTN) spray (400 micrograms/dose).
- This list of drugs really is a minimum for any professional performing invasive treatment.
- Ideally, all public areas, let alone dental practices, should have access to an automated external defibrillator as this is the most valuable single piece of equipment in a cardiac arrest.
- All drugs should be in pre-filled syringes where possible.
- If you buy something, learn how to use it.

## 1. Fainting:

- ∞ Fainting (vaso-vagal syncope) is innocuous providing it is recognized.
- ∞ It is easily the most common cause of sudden loss of consciousness, with up to 2% of patients fainting before or during dental Rx.
- ∞ The possibility of vaso-vagal syncope while under GA, and hence failure to recognize the condition and correct cerebral hypoxia, is the major reason for recommending the supine position.
- ∞ Predisposing factors: pain, anxiety, fatigue, relative hyperthermia, and fasting.
- ∞ Characteristic signs and symptoms: a feeling of dizziness and nausea; pale, cold, and clammy skin; a slow, thin, thready pulse which rebounds to become rapid; and loss of consciousness with collapse, if unsupported.
- ∞ A faint may mimic far more serious conditions, most of which can be excluded by a familiarity with the patient's PMH. These include strokes, corticosteroid insufficiency, drug reactions and interactions, epileptic fit, heart block, hypoglycaemia, and MI.

### ∞ Prevention:

- ∞ Avoid predisposing factors.
- ∞ Treat patients in the supine position unless specifically contraindicated (heart failure, pulmonary oedema).

### ∞ Management:

- ∞ Lower the head to the level of, or below, the heart. Best achieved by laying the patient flat with legs slightly elevated.
- ∞ Loosen clothing (in the presence of a witness!).
- ∞ Monitor pulse. If recovery does not occur rapidly, then reconsider the diagnosis.
- ∞ Determine the precipitant and avoid in the future.
- ∞ If bradycardia persists with no evidence of recovery to rapid full pulse, try tiny dose of atropine (100 micrograms IV).
- ∞ Dose may be repeated up to 600 micrograms.

## 2. Acute chest pain:

- Severe, acute chest pain is usually the result of ischaemia of the myocardium.
- The principal differential diagnosis is between stable angina and an acute coronary syndrome/MI.
- Both exhibit severe retrosternal pain described as heavy, crushing, or band-like. It is classically preceded by effort, emotion, or excitement, and may radiate to the arms, neck, jaw, and, occasionally, the back or abdomen.
- Angina is usually rapidly relieved by rest and glyceryl trinitrate (0.5mg) given sublingually, or spray (400 micrograms per spray), which most patients with a history of angina carry with them.
- Failure of these methods to relieve the pain, and coexisting sweating, breathlessness, nausea, vomiting, or loss of consciousness with a weak or irregular pulse, suggest an infarct.
- Management depends on your immediate environment, but always ensure the patient is placed in a supported upright position if conscious, as the supine position increases pulmonary oedema and hence breathlessness.

### ⇒ **Management:**

- ⌘ In dental practice Summon help (ambulance).
- ⌘ Administer analgesia; the most appropriate form available here will be nitrous oxide/O<sub>2</sub> mixture (50% O<sub>2</sub>).
- ⌘ Don't panic.
- ⌘ Be prepared should cardiac arrest supervene.
- ⌘ Give aspirin 300mg PO.
- ⌘ Tell ambulance staff what you have done.

### → In hospital:

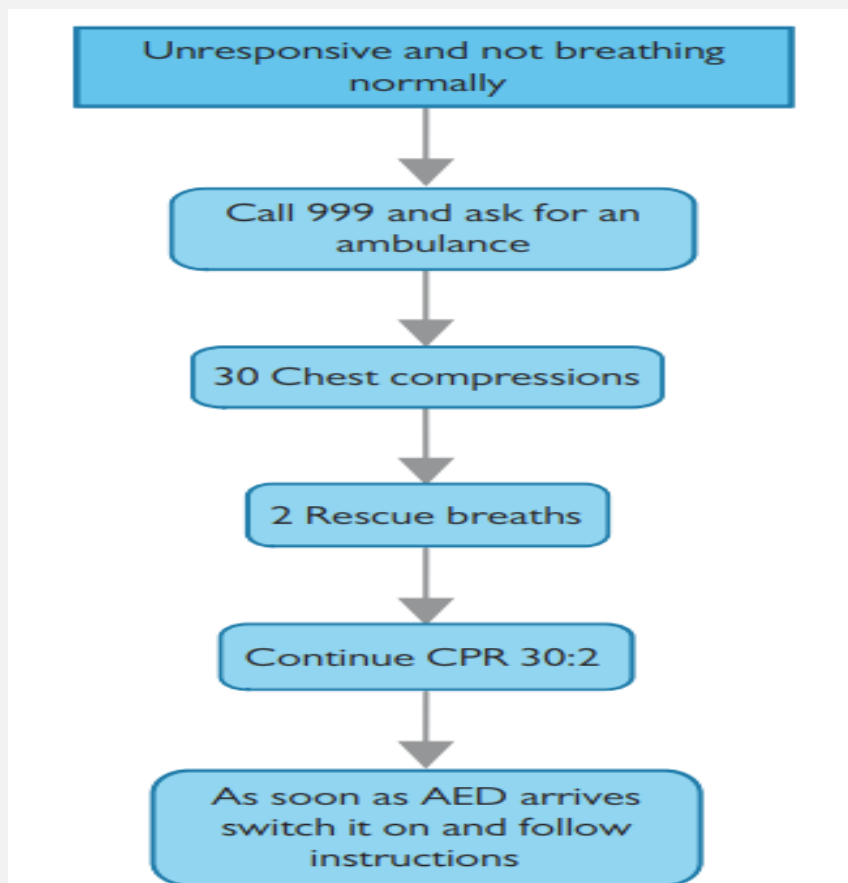
- ⌘ Nurse upright.
- ⌘ Give O<sub>2</sub>
- ⌘ Establish IV access and give an opioid analgesic if available (2.5–5mg of diamorphine is most useful).
- ⌘ Get ECG, U&Es.
- ⌘ Summon help; in units integrated into general or teaching hospitals this may best be achieved by contacting the medical on-call team via the switchboard urgently, as thrombolysis or 1° endovascular intervention, if appropriate, improve outcome.

### 3. Cardiorespiratory arrest:

- ◇ Ninety per cent of deaths from cardiac arrest occurring outside hospital are due to **ventricular fibrillation (VF)**.
- ◇ It is potentially reversible by prompt (<90 seconds) defibrillation.
- ◇ The commonest underlying cause is ischaemic heart disease, but other causes may exist, especially in younger people.
- ◇ Acute asthma, anaesthesia, drug overdose, electrocution, immersion, or hypothermia often precipitate pulseless electrical activity (PEA) arrests.
- ◇ These are treatable conditions and potentially reversible.
- ◇ In certain instances, properly performed cardiopulmonary resuscitation (CPR) can sustain life for up to an hour while a precipitating condition is being treated.

⇒ **Diagnosis and management:**

- These proceed simultaneously:

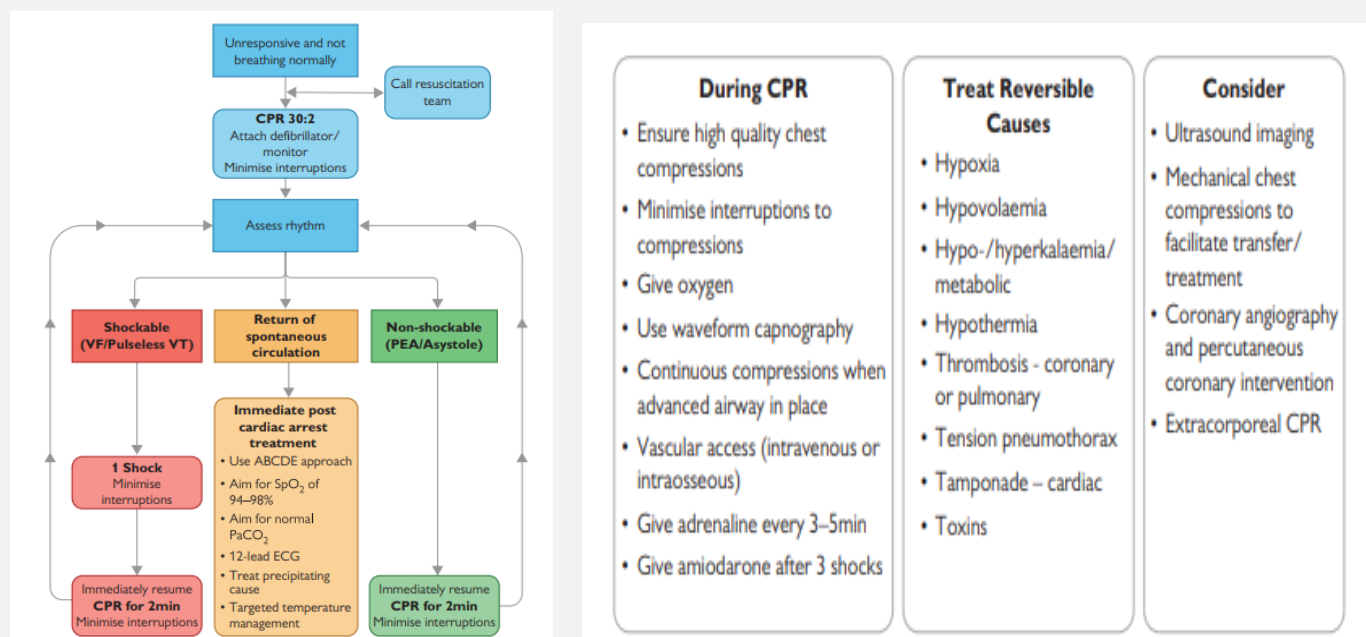


⇒ **Approach and assess:**

- Protect yourself! Do not become another casualty, whether in the street, practice, or hospital environment.
- Gently 'shake and shout' to assess the person's level of consciousness.
- If there is no response, shout for help (and ask whoever goes for help to come back to tell you if help is coming).
- Then:
  - ✗ In witnessed and monitored arrests a single sharp blow over the heart (precordial thump) is worthwhile.
  - ✗ **Airway**—carry out a chin lift or jaw thrust, and clear oropharynx. Remove loose dentures but retain if they are well fitting (it gives a better mouth seal).
  - ✗ **Breathing**—look, listen, and feel for breathing for no more than 10sec (if hypothermia suspected, up to 1min). If the person is breathing normally, place in recovery position. If not, get help even if this means leaving the patient yourself to do it.
  - ✗ Commence chest compressions, at the middle of the lower half of the sternum, delivering 30 compressions in the first instance, before providing 2 rescue breaths.
  - ✗ Remember, statistically the patient's best chance at survival once absence of breathing is confirmed is defibrillation; therefore, getting early help may be the most useful thing you can do. Children and victims of trauma or drowning are exceptions and may benefit from 1min of resuscitation before you leave to get help.

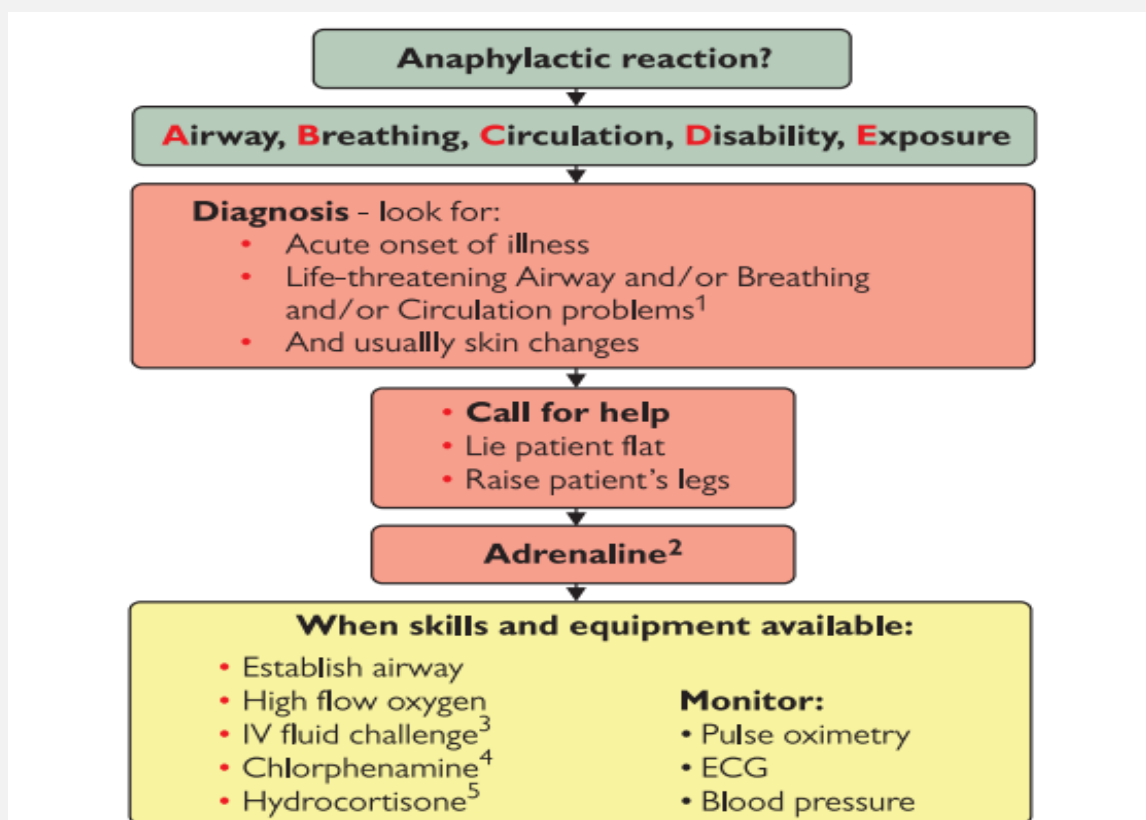
□ Rates of compression/ventilation:

- CPR, single and two rescuers: 30 compressions to 2 ventilations.
- Aim for 100–120 compressions/min.



#### 4. Anaphylactic shock and other drug reactions:

- ✗ Penicillins are the commonest offender, but it is worth remembering that there is a 10% cross-over in allergic response between penicillins and cephalosporins.
- ✗ An anaphylactic reaction is not an all-or-nothing response, and grades of severity are seen.
- ✗ Generally, the reaction starts a few minutes after a par-enteral injection, and not immediately as does a simple faint.
- ✗ Some patients with known severe allergic reactions/previous anaphylaxis will carry an auto-injector (0.3mg adrenaline) to self-administer at the first sign of symptoms.
- ✗ Principal symptoms are facial flushing, itching, numbness, cold extremities, nausea, and sometimes abdominal pain.
- ✗ Signs include wheezing, facial swelling and rash, and cold clammy skin with a thin, thready pulse.
- ✗ Loss of consciousness may occur, with extreme pallor which progresses to cyanosis as respiratory failure develops.
- ✗ It can be difficult to distinguish anaphylaxis from acute asthma in: an asthmatic given an NSAID they are allergic to.
- ✗ Management for acute asthma, then start on management for anaphylaxis:



→ **Angio-oedema:**

- ◇ Angio-oedema is sudden onset, with severe face and neck allergic swelling.
- ◇ The airway is at risk and therefore should be managed as for anaphylaxis.

⇒ Management (in adults):

- ◇ Place patient supine with legs raised, if possible.
- ◇ Check ABCDE (Airway, Breathing, Circulation, Disability + Exposure) and administer O<sub>2</sub> (15L/min).
- ◇ 0.5mL of 1:1000 adrenaline IM. Repeat after 5min, then every 5min until improved. Do not give IV—this concentration will induce ventricular fibrillation.
- ◇ If in practice, an ambulance should be called and the patient transferred to hospital, where the following may be carried out:
  - ✗ Fluid challenge—500–1000mL rapidly—the type of fluid isn't important, just plenty and fast.
  - ✗ 200mg of hydrocortisone IV.
  - ✗ 10mg of chlorphenamine slowly IV (if available).
  - ✗ O<sub>2</sub> by mask.
  - ✗ Salbutamol 0.5mg/mL (1mL) as IM or SC injection in patients on non-cardio selective beta-blockers if no response to adrenaline.

<p><b><sup>1</sup>Life-threatening problems:</b>  <b>Airway:</b> swelling, hoarseness, stridor  <b>Breathing:</b> rapid breathing, wheeze, fatigue, cyanosis, SpO<sub>2</sub> &lt; 92% confusion  <b>Circulation:</b> pale, clammy, low blood pressure, faintness, drowsy/coma</p>																		
<p><b><sup>2</sup>Adrenaline</b> (give IM unless experienced with IV adrenaline)                  IM doses of 1:1000 adrenaline (repeat after 5 min if no better)</p> <ul style="list-style-type: none"> <li>• Adult 500 micrograms IM (0.5 mL)</li> <li>• Child more than 12 years: 500 micrograms IM (0.5 mL)</li> <li>• Child 6–12 years: 300 micrograms IM (0.3 mL)</li> <li>• Child less than 6 years: 150 micrograms IM (0.15 mL)</li> </ul> <p>Adrenaline IV to be given only by experienced specialists                  Titrate: Adults 50 micrograms; Children 1 microgram/kg</p>		<p><b><sup>3</sup>IV fluid challenge:</b>                  Adult - 500–1000mL                  Child - crystalloid 20mL/kg</p> <p>Stop IV colloid if this might be the cause of anaphylaxis</p>																
	<p><b><sup>4</sup>Chlorphenamine</b>                  (IM or slow IV)</p> <table border="0"> <tr> <td>Adult or child more than 12 years</td> <td>10 mg</td> </tr> <tr> <td>Child 6–12 years</td> <td>5 mg</td> </tr> <tr> <td>Child 6 months to 6 years</td> <td>2.5 mg</td> </tr> <tr> <td>Child less than 6 months</td> <td>250 microgram/kg</td> </tr> </table>	Adult or child more than 12 years	10 mg	Child 6–12 years	5 mg	Child 6 months to 6 years	2.5 mg	Child less than 6 months	250 microgram/kg	<p><b><sup>5</sup>Hydrocortisone</b>                  (IM or slow IV)</p> <table border="0"> <tr> <td>Adult or child more than 12 years</td> <td>200 mg</td> </tr> <tr> <td>Child 6–12 years</td> <td>100 mg</td> </tr> <tr> <td>Child 6 months to 6 years</td> <td>50 mg</td> </tr> <tr> <td>Child less than 6 months</td> <td>25 mg</td> </tr> </table>	Adult or child more than 12 years	200 mg	Child 6–12 years	100 mg	Child 6 months to 6 years	50 mg	Child less than 6 months	25 mg
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⇒ **Other drug reactions and interactions:**

- ✂ While there are a multitude of drug interactions which the dental surgeon should be aware of as a prescriber, the drugs most liable to present an emergency problem to the dentist are those which we administer as LAs.
- ✂ Although it is possible to achieve toxic levels of lidocaine, adrenaline, prilocaine, or felypressin without intravascular injection, this generally requires a particularly cavalier attitude to the administration of LA.
- ✂ Commonly, this effect is due to intravascular injection of a substantial proportion of a cartridge of LA.
- ✂ Confusion, peri-oral tingling, drowsiness, agitation, fits, or loss of consciousness may occur.
- ✂ Do not use more than 10 × 2.2mL cartridges of lidocaine/adrenaline.
- ✂ In practice, you will rarely consider coming near this amount.

→ Management:

- × Stop procedure! (They won't be numb.)
- × Place supine.
- × Maintain airway, give O<sub>2</sub>.
- × Await spontaneous recovery (in ~30min) unless tragically a serious event such as MI supervenes, in which case treat as indicated.

**5. Fits:**

- ◇ The majority of epileptic fits do not require active intervention as the patient will usually recover spontaneously.
- ◇ All that is needed is sensible positioning to prevent the patient from damaging themselves.
- ◇ Fits may be precipitated in a known epileptic by starvation, flickering lights, certain drugs such as methohexital, tricyclics, or alcohol, or menstruation.
- ◇ They may also follow a deep faint.

→ **Diagnosis:**

- ① Many epileptics have a preceding aura followed by sudden loss of consciousness with a rigid extended appearance and generalized jerking movements.
- ① Frequently, they are incontinent of urine and may bite their tongue.
- ① There is a slow recovery with the patient feeling sleepy and dazed.

- ⊖ There may be a cause for the fitting: trauma, tumour, and alcohol withdrawal are common.
- ⊖ There are numerous others, any adult should have a first fit fully investigated by a neurologist.
- ⊖ Should the fitting be repeated or last >5min, the patient has entered the state of **status epilepticus**. This is an emergency and requires urgent control.

→ Management:

- ◇ Get help.
- ◇ In a simple major fit, the patient should be placed in the recovery position when practicable and allowed to recover.
- ◇ If they enter status epilepticus, 10mg midazolam IV/buccal/nasal usually aborts the fit; beware respiratory depression.
- ◇ Assess cardiorespiratory function; clear and maintain airway and give O<sub>2</sub> if available.
- ◇ It is worthwhile considering placing an IV cannula or a butterfly in any epileptic patient with less than perfect control, as stress is an important precipitant.
- ◇ **Status epilepticus** should not be allowed to continue for >20min as the mortality rate (up to 30%) and chance of permanent brain damage increase with the length of attack.

→ Management in hospital:

- ◇ Get help. After giving IV benzodiazepines (lorazepam 4mg, midazolam or 10mg diazepam as emulsion 10–20mg) and maintaining an airway, give an IV bolus of up to 50mL of 20–50% glucose unless you are certain blood glucose is >5mmol/L.
- ◇ Establish a 0.9% saline infusion and repeat the benzodiazepines if necessary.
- ◇ If the fits are not controlled it may be necessary to use a phenytoin infusion or induce anaesthesia with thiopental, an IV barbiturate, paralyse, and ventilate.

## 6. Hypoglycaemia:

- Hypoglycaemia is the diabetic emergency most likely to present to the dentist.
- It is an acute and dangerous complication of diabetes and may result from a missed meal, excess insulin, or increase calorific need due to exercise or stress.
- Most diabetics are expert in detecting the onset of hypoglycaemia themselves; however, a small number may lose this ability, particularly if changed to a new form of insulin.

- Recognition of this state is essential and an acutely collapsed diabetic should be assumed hypoglycaemic until proven otherwise like by blood glucose monitoring sticks or blood glucose levels.

→ **Diagnosis:**

- ✂ Disorientation, irritability, increasing drowsiness, excitability, or aggression in a known diabetic, suggest hypoglycaemia.
- ✂ They often appear to be drunk.

→ **Treatment:**

- ✂ If conscious, give glucose orally in any available form.
- ✂ Repeat, if necessary, every 10–15min.
- ✂ Get help.
- ✂ If impaired consciousness, give buccal glucose gel &/or 1mg of IM glucagon.
- ✂ If unconscious, protect airway and place in recovery position.
- ✂ If the correct kit is available, establish IV access and give up to 50mL of 20– 50% glucose.

## 7. **Acute asthma:**

- An acute asthmatic attack may be induced in a patient predisposed to bronchospasm by exposure to an allergen, infection, cold, exercise, or anxiety.
- Characteristically, the patient will complain of a tight chest and shortness of breath.
- Examination will reveal breathlessness, with widespread expiratory wheezing.
- The accessory muscles of respiration may be used to support breathing. If the patient is unable to talk, you are dealing with a potentially fatal episode.

→ **Management:**

- ◇ Make use of the patient's own anti-asthmatic drugs, such as salbutamol inhalers. Ideally, this should be administered in the form of a nebulizer using 24% O<sub>2</sub> and nebulized salbutamol.
- ◇ A do-it-yourself spacer can be fabricated from the patient's own inhaler pushed through the base of a paper cup.
- ◇ Repeated depressions of inhaler plunger will create an aerosol inside the cup which the patient can inhale.
- ◇ This will relieve most reversible airways obstruction.

- ◇ Steroids should be administered either as oral prednisolone, if the patient carries these with them, or as IV hydrocortisone up to 200mg IV, if available.
- ◇ This combination of salbutamol, steroids, and O<sub>2</sub> will often completely resolve an attack; however, in individuals who do not respond, an urgent hospital admission is required.
- ◇ Patients who are only partially responsive must have underlying irritants such as a chest infection either excluded or treated.
- ◇ Be aware of the possibility of anaphylaxis mimicking acute asthma. Remember adrenaline 0.5mL 1:1000 IM.

→ Management in dental practice:

- ◇ Keep the patient upright.
- ◇ Administer salbutamol by inhaler and a spacer device. Repeat every 10min until resolved (or ambulance arrives).
- ◇ Give O<sub>2</sub>.
- ◇ If a complete response takes place, it is reasonable to allow the patient to return home. If there is any doubt, arrange for the patient to be seen at the nearest emergency department.

## 8. Vasovagal attacks:

- ✗ Vasovagal syncope occurs when you the [patient faint because the body overreacts to certain triggers, such as the sight of blood or extreme emotional distress.
- ✗ It may also be called neurocardiogenic syncope.
- ✗ The vasovagal syncope trigger causes your heart rate and blood pressure to drop suddenly.
- ✗ That leads to reduced blood flow to your brain, causing you to briefly lose consciousness.
- ✗ Vasovagal syncope is usually harmless and requires no treatment.
- ✗ But it's possible that you may injure yourself during a vasovagal syncope episode.
- ✗ Your doctor may recommend tests to rule out more-serious causes of fainting, such as heart disorders.

→ **Symptoms**

- Pale skin
- Lightheadedness
- Tunnel vision — your field of vision narrows so that you see only what's in front of you
- Nausea
- Feeling warm
- A cold, clammy sweat
- Blurred vision

→ During a vasovagal syncope episode, bystanders may notice:

- Jerky, abnormal movements
- A slow, weak pulse
- Dilated pupils

→ Recovery after a vasovagal episode generally begins in less than a minute.

→ However, if you stand up too soon after fainting — within about 15 to 30 minutes — you're at risk of fainting again.



## 9. Inhaled foreign bodies:

- ✗ The combination of delicate instruments and the supine position of patients for many dental procedures inevitably increase the risk of a patient inhaling a foreign body.
- ✗ Patients with facial trauma often have missing teeth—always think where could they be? Two basic scenarios are likely, depending on whether or not the item impacts in the upper or lower airway.

### → Upper airway:

- This will stimulate the cough reflex, which may be sufficient to clear obstruction.
- A choking subject should be bent forward to aid coughing.
- If the obstruction is complete or there are signs of cyanosis in:

#### ✂ Conscious patient:

- Support chest with one hand, strike between the scapulae with the heel of your other hand. Repeat up to five times if needed.
- If this fails, carry out abdominal thrusts (Heimlich manoeuvre) by encircling the victim with your arms from behind and delivering a sharp upward and inward squeeze to create sudden expulsion of air.
- Repeat up to five times.
- Alternate five back blows with the five abdominal thrusts. The first attempt is most likely to succeed, and they may vomit.

#### ✂ Unconscious patient:

- CPR should be commenced; this will provide circulatory support as well as help dislodge the foreign body.
- If all else fails, cricothyroid puncture may preserve life if the obstruction lies above this level.

### → Lower airway:

- As only a segment of the lungs will be occluded, this presents a less acute problem. It is also easier to miss.
- Classically, this involves a tooth or tooth fragment slipping from the forceps and being inhaled.
- With the patient in a semi-upright position, the object ends up in the right posterior basal lobe.

- Should this happen, inform the patient and arrange to have a CXR taken as soon as possible. If the offending item is in the lungs, removal by a chest physician by fibre-optic bronchoscopy is indicated, as failure to remove the tooth is inevitably followed by collapse and infection distal to the obstruction.
  
- ⇒ When a lost tooth cannot be located, it must be searched for; ingestion is not a real problem, but inhaled teeth must be removed:



The End