



# The emergency administration of oxygen



**Emma Hammett** describes when and how

to administer oxygen during an emergency in the dental practice.

**M**any dental practices hold oxygen for the treatment of acute medical emergencies. It is vital to ensure that this is given appropriately to optimise a casualty's best chance of survival. Oxygen should only be administered by staff who are trained and competent. Guidelines for oxygen administration are set by the British Thoracic Society.

In most emergency situations, oxygen is given to patients immediately, without a formal prescription. In all other circumstances, a prescription is essential. When oxygen is given without a prescription in an emergency, a subsequent written record must be made of exactly what oxygen therapy has been given to the casualty, in addition to recording, in writing, the rest of the emergency treatment.

Historically, oxygen has been an integral part of the emergency treatment of ill or injured patients. It has been widely believed that oxygen helps the casualty with their breathing. This is not the case - oxygen is a drug for the treatment of hypoxaemia, not breathlessness. In a conscious casualty, oxygen should be prescribed according to a target saturation range and those who administer oxygen therapy must monitor the patient closely and keep within the range (Figure 1).



**Fig. 1** Checking oxygen saturation with a pulse oximeter

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## CPD questions

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**Giving oxygen to a conscious casualty in an emergency situation**

Extreme care should be given when administering oxygen to a conscious patient and it should ideally only be given whilst closely monitoring their oxygen saturation with a pulse oximeter. If oxygen saturation levels are less than 94% then oxygen may be indicated. However, if the casualty has pre-existing chronic obstructive airways disease or is at risk of hypercapnic respiratory failure - the indicated pulse oximeter saturation level is considerably lower at 88 to 92%.

Giving oxygen to these patients with higher oxygen saturation could prove fatal.

If a patient's oxygen saturations demonstrate that they are hypoxic and they are conscious, oxygen is indicated for the following conditions:

- Myocardial infarction and acute coronary conditions
- Stroke
- Cardiac rhythm disturbance
- Implantable cardioverter defibrillator firing
- Glycaemic emergencies.

Because oxygenation is reduced in the supine position, fully conscious hypoxaemic patients should ideally be allowed to maintain the most upright posture possible, or the most comfortable posture for the patient.

Oxygen saturation, sometimes referred to as the fifth vital sign, should be checked by pulse

oximetry in all breathless and acutely ill patients. The other vital signs are pulse, blood pressure, temperature and respiratory rate – capillary refill time is also helpful. Oxygen saturation, sometimes referred to as the fifth vital sign, should be checked by pulse oximetry in all breathless and acutely ill patients.

**Storage and cleaning of your oxygen cylinder**

The most commonly used portable cylinder is the C/D cylinder. It is pressurised to 2000 psi and contains 450L of Oxygen when full. Oxygen tanks should only be cleaned with soap and water as cleaning with other products could cause combustion. Oil and petroleum-based products must be stored away from cylinders as they could cause a fire.

The gauge on the side of the tank should be regularly checked and the cylinder replaced if the needle points to the red zone (Figure 2).

**Administering oxygen**

Prior to administration turn the dial on the side of the tank to the fully 'on' position. The litre flow gauge is found on top of the cylinder and you should turn this to choose the most appropriate litre flow. Oxygen tubing should be securely connected to the 'Christmas tree' adapter on the top (Figure 3).

Oxygen is highly flammable so be extremely careful using it if there is a fire at the scene of an incident and during defibrillation. Oxygen should be moved away by at least an arm's length



**Fig. 3 Oxygen cylinder front and back**



**Fig. 2 Oxygen cylinder needs replacing as it is in the 'red zone'**

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prior to administering a defibrillating shock.

If the casualty is conscious, low flow oxygen can be administered through nasal cannula (nasal specs). Give at a rate of 1-6L/min.

Alternatively, you can give oxygen to a conscious casualty through a non-rebreather mask. This can be used to administer high flow oxygen. This would be required for the patient spontaneously breathing and displaying signs and symptoms of hypoxia with an accompanying low pulse oximetry reading. It requires a flow rate of 12-15L/min. Prior to administration the reservoir bag should be filled with oxygen by placing a finger over the

one-way valve to enable it to fill. The reservoir bag should not be completely empty when the patient inhales.

Both the nasal cannula and the non-rebreather mask are only effective when the patient is breathing.

**For an unconscious patient – administering oxygen using a BVM**

In an unconscious non-breathing casualty, oxygen should be administered through the bag and valve mask (BVM) (Figure 4). Airway adjuncts may be deployed if available and appropriately trained staff are able to insert them.



**Fig. 4** Delivering oxygen through the bag and valve mask (BVM)

For a patient who is unconscious and not breathing or struggling with respiratory effort, positive pressure ventilation should be initiated immediately. If there is no oxygen available, the BVM can be used with room air.

In order to ventilate a patient effectively; tilt the head and lift the chin, or perform a jaw thrust. Maintain a tight seal between the patient's face and the mask, this is best achieved using the C grip. If the patient is unconscious and without a gag reflex and airway adjuncts are available, the airway may be better maintained using an Igel, oropharyngeal or nasopharyngeal airway, provided you are trained and competent to use them. (nasopharyngeal airways can be used even with a gag reflex).

For an unconscious casualty with a pulse, or someone with severely depressed respiratory function, a ventilation rate of one breath every 6 seconds is adequate, and success can be seen when chest rise is observed. Do not over-ventilate, squeeze gently and steadily until chest rise is observed. Although ventilation via BVM can be accomplished with one rescuer, a greater success rate can be achieved with two people. One rescuer ensures an airtight seal between the mask and the patient's face, the second squeezes the bag every six seconds.

If giving chest compressions in combination with the BVM, you should use the ratio of 30 compressions to 2 BVM squeezes. Do not over-ventilate the patient. Squeeze gently and steadily. Take care to ensure you continue to tilt the head and lift the chin to maintain an optimally open airway.

Oxygen should not be given without accompanying pulse oximetry (SpO<sub>2</sub>) monitoring. However, it is important to understand that pulse oximetry is unable to detect carbon monoxide blood concentrations

or rising concentrations of carbon dioxide. It is vital to carefully monitor the whole patient and escalate care to the emergency services and appropriate advanced care physicians as quickly as possible.

**Further reading**

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