A guide to resuscitation and emergency life support

In the second of a series outlining basic life support, **Emma Hammett** describes how to resuscitate a patient who has collapsed in the dental practice

Cardio-respiratory arrest is rare in primary dental practice. However, it's essential all dentists and dental care professionals are competent in treating cardio-respiratory arrest.[1]

A patient could collapse on any premises at any time, whether they have received treatment or not. It is therefore essential that ALL registrants are trained in dealing with medical emergencies, including resuscitation, and possess up to date evidence of capability.' (Quality standards for resuscitation published by the Resuscitation Council (UK))

Accurate and up-to-date medical histories should allow those most at risk of a medical emergency to be identified in advance of any proposed treatment. Dental practitioners and other dental care professionals must be trained in cardiopulmonary resuscitation (CPR) so that in the event of cardio-respiratory arrest occurring they can:

- recognise cardio-respiratory arrest
- summon help immediately (dial 999)
- start CPR, using chest compressions and providing ventilation with a pocket mask or bag-mask device and supplemental oxygen. (Evidence suggests that chest compressions can be performed effectively in a fully reclined dental chair).

Fig. 1 AED

- attempt defibrillation (if appropriate) within 3 minutes of collapse, using an Automated External Defibrillator (AED)
- provide other advanced life support skills if appropriate and if trained to do so

Additionally, all dental professionals who work with children should learn how CPR in adults differs between children and adults and practise on paediatric mannequins.

With other staff at their surgeries or clinics they should update their knowledge and skills in resuscitation at least annually.

A system must be in place for identifying which equipment requires special training, (such as AEDs, bag-mask devices and oropharyngeal airway insertion) and for ensuring that such training takes place.

All new members of dental staff should have resuscitation training as part of their induction programme. As part of the new GDC enhanced cpd scheme, training in medical emergencies and CPR is required for registrants under development outcome C: Maintenance and development of knowledge and skill within your field of practice.

Automated external defibrillator (AED)

It is recommended that all dental practices should have immediate access to an AED (Fig. 1).

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All AEDs are suitable for use in adults and children. Paediatric pads allow for the modification of the AED for children under eight years of age. It's recommended that practices specialising in the treatment of children buy paediatric pads. If paediatric pads are not available, adult pads can be used on children over the age of one year; one pad should be positioned on the centre of the chest and the other on the back of the child.

If a casualty appears to be unconscious, there is a clear protocol as to what to do, beginning with the Primary Survey. This was covered in the first part https://www.nature.com/articles/bdjteam2018201 of this series of articles along with detailed instructions concerning the Recovery Position.

The Primary Survey is a fast and systematic way to find and treat any life-threatening conditions in order of priority. It's a systematic way of treating life-threatening conditions in order of priority:

- Remove danger
- Check for response
- Open the airway
- Check for breathing

the defibrillator immediately. Using the defibrillator early dramatically increases their chances of survival.

When you are resuscitating someone, you become their life support machine. By pushing on their chest, you are their heart and by breathing into them, you are their lungs. You are keeping their heart and brain full of oxygenated blood and keeping them alive.

When an adult collapses and is assessed as unresponsive and not breathing; they are likely to still have residual oxygenated blood remaining in their system. However, their heart is no longer working effectively, and it is therefore important to quickly circulate the oxygenated blood in their system to sustain the blood supply to their heart and brain, by pushing hard and fast on their chest.

Resuscitation

- Push hard and fast on the centre of their chest
- Push down to a depth of 5-6 cms – roughly a third of their chest
- At a rate of 115 - 120 beats per minute – roughly 2 per second

'RESEARCH HAS SHOWN THAT IT TAKES AROUND 10 -12 COMPRESSIONS TO REACH SUFFICIENT PRESSURE TO GET THE BLOOD CIRCULATING TO THE HEART AND BRAIN'

If the patient is unconscious and breathing properly – at least 2 normal breaths in a 10 second period - then put them in the recovery position. If they are not breathing normally, or you are unsure – start CPR. (Figure 2)

When to phone an ambulance if you are on your own:

For a baby or child: If you are on your own, you should perform 1 minute's CPR before phoning for an ambulance (5 breaths, 30:2, 30:2 is about a minute) (Figure 3). For an adult phone for an ambulance as soon as you realise that they are unresponsive and not breathing. An adult who collapses is more likely to have a heart problem and need a defibrillator and advanced life support while a child is more likely to have a breathing problem and your immediate intervention with mouth-to-mouth could bring them round.

If there is someone else available, they should call for an ambulance as soon as it is established whether or not the person is breathing. If they are not breathing, get

- Do 30 compressions then…

To give someone the best chance, you will need to:

- Tilt the head and lift the chin to take the tongue off the back of the airway, hold their nose,
- Give 2 breaths – sealing your mouth around their mouth and blowing into them like a balloon.

Make sure their chest rises each time – if it doesn't – try tilting the head a bit more.

If it still doesn't rise, go straight back to the compressions.

Research has shown that it takes around 10 -12 compressions to reach sufficient pressure to get the blood circulating to the heart and brain, this is why it is advised that you do 30 compressions and then 2 short breaths to top up their oxygen.

Use a face shield or pocket face mask to protect yourself.

If you are trained in the use of airway adjuncts and a bag and valve mask (BVM) this is preferable to mouth to mouth.

Keep going – you are being a life support machine and keeping them alive.

Do not expect them to come back to life until the paramedics are there to help. Therefore, don't stop to check for signs of life, just keep going, unless it is very obvious that there are signs of life.

Fig.2 Adult CPR

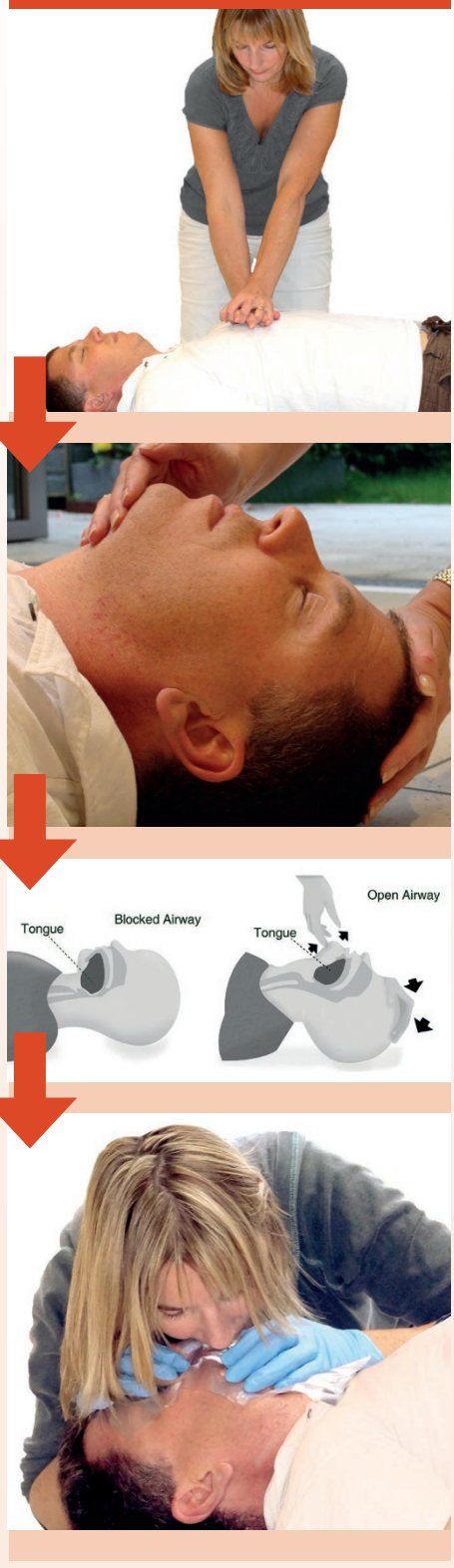


Fig. 3 How to do child or baby CPR

Do 5 rescue breaths before you start compressions and phone an ambulance if on your own, after completing one minute's CPR.

Start with 5 rescue breaths to re-oxygenate them as children do not retain residual oxygen in their system as adults do. It is also far more likely that they have experienced a respiratory arrest.

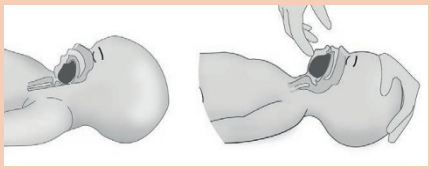
Carefully tilt the head and lift the chin to open the airway, then give 5 rescue breaths to re-oxygenate them. Do not tilt a baby's head too far back - just to horizontal is sufficient; over extending a baby's airway can occlude it.

For a baby, seal your mouth around their mouth and nose if you can fit your mouth over both and blow into them gently with a puff of your cheeks. For a child you can blow a little harder, just enough to inflate their lungs. If you over-inflate them you will fill the stomach with air, which can displace its contents. Be ready with suction if they begin to gurgle.

You will then need to circulate the oxygenated blood by pushing down hard and fast on their chest. For a child use one hand, for a baby use two fingers or thumbs.

- Push hard and fast on the centre of their chest – roughly between the nipples
- Push down by a third of the depth of their chest.
- At a rate of 110 -120 beats per minute – roughly 2 per second

After about 30 compressions you will need to give them 2 more short breaths and then continue with the compressions again. 30:2:30:2:30:2…



Use your AED machine as soon as possible! Deploying an AED within 3 minutes, if someone is unconscious, not breathing and in a shockable rhythm has been shown to increase the chances of survival from 6% to 74%. For every minute's delay over that 3 minutes, the chances decrease by 10%.[2] Ensure everyone in the practice knows where the AED is kept and how to use it.

If there is someone to help, do cycles of compressions and breaths and swap every 2 minutes. One person should be responsible for the compressions and the breaths (unless you are using a bag and valve mask) – you should give 30 compressions to two breaths.

When swapping compressions, aim to minimise the time when no one is pressing on the chest. When the 30 compressions have been completed, the person swapping out should complete their 2 breaths, whilst the person taking over gets into position to commence the chest compressions. Swapping every 2 or 3 minutes will maximise the effectiveness of the chest compressions and give time for those giving the compressions to recover before recommencing. CPR is hard work!

If you are using a BVM ensure you are squeezing steadily and not over ventilating them. We will cover bag, valve and mask ventilation in a future article.

When to stop:

- If you are too tired to continue.
- When the paramedics have taken over.
- Whilst the defibrillator is analysing the heart rhythm and if a shock is advised. Be ready to recommence as soon as the shock has been given.

You should continue CPR until it is obvious the patient is breathing normally.

The next article in the series will be on AEDs.

1. https://www.resus.org.uk/quality-standards/primary-dental-care-quality-standards-for-cpr/
2. Valenzuela TD, Roe DJ, Nichol G, Clark LL, Spaite DW, Hardman RG. Outcome of rapid defibrillation by security officers after cardiac arrest in casinos. *N Eng J Med* 2000; **343:** 1206-1209

Emma Hammett is a qualified nurse and award-winning first aid trainer with over 30 years' healthcare and teaching experience. She is the Founder and CEO of First Aid for Life, a multi-award-winning, fully regulated first aid training provider specialising in first aid and medical emergency training for Dental Practices.

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bdjteam201912