CPD4dentalhygienists

YOUR FUTURE IN YOUR HANDS

Medical Emergencies: The Chain of Survival and Basic Life Support (updated 2023)

Aims: This article looks at the 'Chain of Survival' in a medical emergency, discusses basic life support, the use of an Automated External Defibrillator and resuscitation of children and babies.

Objectives: On completion of this verifiable CPD article, the participant will be able to demonstrate, through completion of a questionnaire, the ability to:

- Identify the steps involved in the chain of survival
- Identify some of the areas of heightened emphasis in the Resuscitation Council (UK) Guidelines 2021
- Identify some of the steps involved in basic life support
- Identify key differences in the basic life support sequence when performed on an infant or child, as opposed to an adult
- Pass a multiple-choice questionnaire, scoring higher than 70%

Introduction

The Resuscitation Council (UK) Guidelines 2021 were published in May 2021. Although there are no major changes, there is a heightened emphasis on:

- Cardiac arrest recognition remains a key priority as it is the first step in triggering the emergency response to cardiac arrest.

- Recognise cardiac arrest has occurred in any unresponsive person with absent or abnormal breathing.

- The ambulance call handler will assist with instructions for confirming cardiac arrest, starting compression-only CPR, and locating, retrieving and using an AED.

- Provide chest compressions as soon as possible after cardiac arrest is confirmed.

- Send someone to fetch an AED and bring it to the scene of the cardiac arrest. The British Heart Foundation database, “The Circuit” serves as a national resource for the location of AEDs.

- Use the recovery position, only if a person's conscious level is reduced and they do not meet the criteria for starting CPR.

The Chain of Survival shows four critical steps which, when delivered effectively and in sequence, give the victim the best chance of survival.

Guidelines 2021 also highlight that, within the UK:

- Ambulance services attempt resuscitation in approximately 30,000 people each year.
- The annual incidence of out-of-hospital cardiac arrest (OHCA) is approximately 55 per 100,000 inhabitants.
- Most cardiac arrests (72%) occur in the home or a workplace.
- Most cardiac arrests occur in adults (98%) and about one third of these are between the age of 15-64 years of age.
- Bystander CPR is attempted in 7 out of 10 out-of-hospital cardiac arrests.
- Public access defibrillator use is reported as being used in less than 1 in 10 OHCA.
- The average ambulance response time is 6.9 minutes.
- When resuscitation is attempted, just fewer than one in ten (9%) people survive to hospital discharge following OHCA.

The management of out-of-hospital cardiac arrest (OOHCA) in adults

The management of OOHCA (Guidelines 2021) comprises:

- Basic Life Support (BLS) which is described as airway, breathing and circulation support without the use of equipment other than a protective barrier device.
- The use of an AED.

Basic Life Support

There is a saying that, the simple things done well usually make the biggest difference. This is true when dealing with a cardiac arrest. Unfortunately, some people worry about stepping-in, and that helping might not be a good thing. They worry whether they can do anything to help. They worry about doing something 'wrong' and causing further harm. They worry – while the cardiac arrest victim's chance of survival drops every second there is a delay. So, can a potential rescuer do any harm to a victim of cardiac arrest? No!

Cardiac arrest victims will stay in cardiac arrest if there is no bystander CPR. In other words, dead will stay dead for sure! Some bystander intervention is better than none at all. Not every victim of cardiac arrest will survive, but who knows that when a person collapses? Nobody does. Bystander knowledge, confidence, skill and ability will vary, which is why it is so important to be trained. Fortunately, staff in dental and orthodontic practices benefit from annual refresher/update sessions that include practical CPR using manikins.

Dental and orthodontic practices are very safe environments when dealing with a cardiac arrest. But the cardiac arrest you deal with may happen on the pavement, in the park, along a dark road. Think of your safety first. So, keeping it simple, think: *as long as you are safe, if you have an unresponsive person who does not appear to be breathing normally, alert the emergency services and start CPR.* All the time it is not obvious to you that the person is alive, keep doing CPR.

- Ensure it is safe to approach the victim. Think of safety as sight, sound and smell. Is there anything that you can see, hear or smell that might pose a danger to you, the victim or bystanders.

- Check the victim for a response by speaking loudly then gently shaking the shoulders. This is also known as 'shout and shake'.

- Open the airway by tilting back the head, placing two fingers under the point of the chin, and lifting the chin. Checking for an obstruction in the airway of an adult is no longer recommended. Use the technique of looking, listening and feeling to determine if the victim is breathing normally. Take no more than *ten seconds* to check for normal breathing. "In the *first few minutes* after cardiac arrest, a victim may be barely breathing, or taking infrequent, slow and noisy gasps. Do not confuse this with normal breathing. If you have any doubt whether breathing is normal, act as if they are not breathing normally and prepare to start CPR" (www.resus.org.uk)

- Ask somebody to make the emergency call for you, otherwise make the call yourself. If you can, stay with the victim. Some cordless and corded phones have a *speaker* button, so use this to enable you to perform CPR whilst talking with the ambulance dispatcher.

- Don level 3 personal protective equipment.

- If an AED is available, send somebody to get it. If you are on your own, do not leave the victim, start CPR.

- Perform good quality, uninterrupted CPR. The compression rate is 100-120 per minute, pressing down 5-6 cm (approximately 5 cm but not more than 6 cm) on the lower half of the sternum. Give 30 compressions followed by two rescue breaths, taking no more than *ten seconds* to deliver the breaths. The breaths should not be forceful or rapid, and each breath should take one second and be sufficient to make the chest rise as normal. Continue with chest compressions and rescue breaths in a ratio of 30:2.

Remember: suspect cardiac arrest in a victim who is unresponsive and not breathing normally, and start CPR.

The availability of a pocket mask or bag-valve-mask means that dental staff can administer rescue breaths without physical contact with the patient, so it is important that staff are familiar with the use of such equipment.

CPR providers who are *trained and able* to deliver rescue breaths should do so. Rescuers who are *untrained or unable* to deliver rescuer breaths should deliver chest compression only CPR (CCOCPR). The evidence states that the victim of sudden, non-asphyxial, cardiac arrest has *some minutes* of oxygen in the lungs and arterial system.

"Trained and able" applies to those who have received practical training. An untrained lay person may be unsure about starting CPR and may not want to attempt rescue breathing. However, a person who has attended CPR training is likely to begin CPR. Dental staff attend regular CPR training and have adjuncts (pocket mask and bag-valve-mask) to assist during CPR. Therefore, clinical staff (if not all staff?) should be "trained and able" to perform chest compressions and rescue breathing because they receive regular training and have adjuncts. This echoes the statement in the paragraph above.

CPR is hard work and physically demanding. It is a work-out. Be aware that your compression rate and compression depth will reduce with fatigue, so it is important to swap rescuers to maintain CPR quality. This emphasises the importance of a co-ordinated team approach within the dental and orthodontic practice. CPR should not be interrupted unless you become exhausted, an ambulance crew takes over, or you are certain the victim is alive. If you are in any doubt as to whether the person is alive, continue with good quality CPR.

The use of an AED

The Resuscitation Council state that: "All clinical dental areas should have immediate access (within the first minutes of a cardiorespiratory arrest) to oxygen, resuscitation equipment for airway management including suction, and an automated external defibrillator (AED). The standard AED sign should be used in order to reduce delay in a defibrillator in an emergency."

The standard AED signage reinforces the following key messages:

- Anyone can use and AED- you do not need prior medical or first aid training.
- It is easy to use- you just follow the instructions.
- It is for use on an unconscious person who is not breathing at all or not breathing normally.

Evidence states that when defibrillation is attempted within three minutes of cardiac arrest, the person has up to a 70% chance of survival. Unless there is an AED on site, it is hard to imagine how the majority of dental and orthodontic practices could achieve ‘pads on the chest’ within these critical three minutes.

When the AED arrives, switch it on, follow the voice/visual prompts, and apply the pads without interrupting CPR. Ensure nobody is touching the victim when the AED is analysing and when the shock is delivered. Not every victim will require a shock. Whether or not a shock has been delivered, follow the voice/visual prompts and continue CPR when prompted by the AED.

Dental practices should check the age range for their specific AED.

Resuscitation of children and infants (babies)

The adult BLS sequence for a child is far better than not doing anything at all. However, there are modifications that will make it more suitable for children and infants:

- Start by giving 5 rescue breaths.
- Look for signs of life such as movement, coughing, or normal breathing (take no more than *ten seconds* to do this). If there are no signs of life, start CPR.
- If you are on your own, perform CPR for one minute before leaving to get help.

- Compress the chest *at least one-third* of its depth. This will be approximately 5 cm for an older child and approximately 4 cm for the infant. Use one or two hands for a child over 1 year and two fingers for the infant under 1. Never press deeper than the adult 6 cm limit (approximately the length of an adult's thumb.
- To avoid compressing the abdomen, press down on the sternum one finger's breadth above the xiphisternum.
- Use a compression: ventilation ratio of 15:2 if you are confident and competent in your resuscitation skills. This ratio will usually only be provided by healthcare professionals with a duty to respond to paediatric emergencies. Within dental and orthodontic practices, one person alone may be able to provide compressions and ventilations. If two or more staff are available as rescuers, then one could deliver compressions while the other delivers rescue breaths. In such a case, a two-thumb encircling technique can be used. The team approach is key.
- A lone rescuer with a mobile phone should call for help after the five rescue breaths, then move on to the next step while waiting for the emergency services to answer (activate the speaker function on the phone).

When performing rescue breaths:

- Ensure head tilt and chin lift in a child over 1 year.
- Keep the head of an infant in a neutral position and lift the chin (when an infant is supine, the head is usually flexed and may require a degree of extension).
- If the infant's mouth and nose cannot be covered by the rescuer's mouth, then the rescuer can try to seal only the mouth or nose of the infant whilst closing the other.

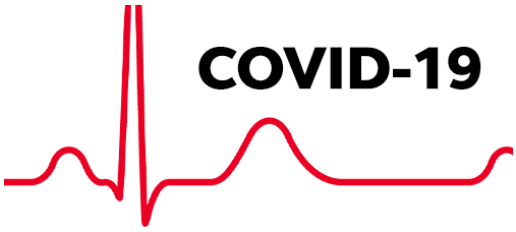
Age definitions:

- An infant is under the age of one year.
- A child is between one year and 18 years of age.

To summarise, the main points for dental and orthodontic staff are:

- Remember the importance of the Chain of Survival.
- Start CPR if the victim is unresponsive and does not appear to be breathing at all or not breathing normally.
- Stay with the victim if you can - get somebody else to make the emergency call for you.
- **Don level 3 personal protection equipment.**
- Apply defibrillation pads within three minutes of diagnosing cardiac arrest.
- Be confident and competent in using a pocket mask or bag-valve-mask.
- CPR is physically demanding. Swap regularly with other members of the team to maintain CPR quality.
- Not every victim of cardiac arrest requires defibrillation, but every victim of cardiac arrest requires CPR.

Resuscitation Council UK Statement on COVID-19 in relation to CPR and resuscitation in first aid and community settings



The Resuscitation Council UK Statement was updated in August 2022 and is as follows:

"New evidence has emerged suggesting a low likelihood that airway management manoeuvres are aerosol generating, leading to the removal of airway management manoeuvres from the list of aerosol generating procedures.

We await further evidence on whether chest compressions generate aerosol. Until such evidence emerges we remain concerned that the provision of chest compressions and the proximity of the rescuer to the patient may constitute a risk of aerosol transmission.

In light of this new information we recommend:

- the curriculum for training members of the public and healthcare professionals reverts to the guidance set out in our **quality standards**
- members of the public and healthcare professionals follow **our 2021 guidelines for resuscitation**
- for those working in healthcare settings, the use of FFP3 masks or respirators as well as eye protection is still recommended when performing chest compressions for patients with suspected or confirmed COVID-19. AGP PPE, in particular FFP3 mask/respirator and eye protection, should be donned as swiftly as possible to avoid any delays in treatment."

The above mentioned quality standards and 2021 guidelines can be accessed in the further reading section of this article.

Biography

Jon Andersen of ST4 Training

Jon Andersen is the sole proprietor of ST4 Training and has personally delivered over 2000 courses to a range of organisations. The majority of Jon's training is with GP and dental practices.

Previously, Jon was a Paramedic, Operational Station Officer, Aircrew Paramedic (one of the first six in Sussex), Advanced Exercise Referral Instructor, and Phase IV Cardiac Rehabilitation Exercise Specialist.

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Personal Development Plan and Reflective Learning

This CPD is linked to the following GDC Enhanced CPD Development Outcome:

C. Maintenance and development of knowledge and skill within your field of practice.

Reflective learning is now a requirement of the GDC Enhanced Professional Development Scheme. As such, you will now have the opportunity to answer some reflective learning questions, if you complete these now you will fulfil the requirements of the GDC. These will be:

1) What did you learn (or confirm) from the activity that was helpful or relevant to your daily work and patients?
2) Comment on any changes/updates needed in your daily work
3) How has completion of this CPD article benefitted your work as a DCP?

Examples will be provided. Please remember that you need to fill this in on completion of the exam, but you can also update this at any time from your CPD log. If you take a few moments to write your reflection on completion, you will have fulfilled the Enhanced CPD requirements.

Further Reading

https://www.resus.org.uk/library/2021-resuscitation-guidelines

https://www.resus.org.uk/library/2021-resuscitation-guidelines/paediatric-basic-life-support-guidelines

References:

Resuscitation Council (2021) Available from https://www.resus.org.uk/library/2021-resuscitation-guidelines (accessed 14/05/2023)

Resuscitation Council (2021) https://www.resus.org.uk/quality-standards/introduction-and-overview/ (accessed 14/05/2023)

Resuscitation Council (2021) https://www.resus.org.uk/defibrillators/standard-sign-for-aeds// (accessed 14/05/2023) Resuscitation Council UK (2022) Resuscitation Council UK Statement on COVID-19 in relation to CPR and resuscitation in first aid and community settings

Resuscitation Council UK (2023) Guidance: COVID-19 Update to Resuscitation Council UK (RCUK) guidance for practice. Available at: https://www.resus.org.uk/library/additional-guidance/guidance-covid-19 (accessed 14/05/2023)