



Inclusive Educational Content

BASIC

LIFE SUPPORT

SaveLife: Reorganizing Basic/Advanced Life Support
Training Through the Use of Innovative Digital Materials

Erasmus+ Project
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SaveLife

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*“SaveLife: Reorganizing
Basic/Advanced Life Support
Training Through the Use of
Innovative Digital Materials”*

SaveLife Project

The “Save Life: Reorganizing Basic/Advanced Life Support Training Through the Use of Innovative Digital Materials” (SaveLife) project is a pioneering initiative funded by the European Union within the Erasmus+ KA220 program. This project aims to revolutionize the training methods for Basic and Advanced Life Support (B/ALS) by providing medical staff with up-to-date, open, and free access to high-quality B/ALS training materials. These materials can be used as booster training or as a complement to in situ training when deemed necessary by trainers.

Basic and Advanced Life Support training is essential for medical professionals to effectively handle cardiac arrest situations. BLS training is typically introduced early in medical education and is further developed through ALS training. This knowledge is crucial for physicians to deal with cardiac emergencies, and the SaveLife Project aims to ensure that these skills are kept current and accessible.

The SaveLife Project primarily targets university staff, medical students, nurses, paramedics, and general practitioners who work or will work in high-risk areas. By focusing on these groups, the project aims to make a significant and lasting impact on B/ALS training across Europe.

The SaveLife Project stands out due to its innovative approach: Interactive Digital Tools, Increased Accessibility, Diverse Consortium.



SaveLife





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Chapter 1. Recovery Position

Gergana Ivanova

Chapter 1. Recovery Position

The recovery position is a crucial first aid technique used for people who are unconscious but still breathing and have a circulation. Its main purpose is to keep the airway open and clear, preventing blockage by things like vomit, debris, or even the person's own tongue. Lying flat on the back (supine position) can put the airway at risk, so rolling an unconscious person onto their side in the recovery position significantly reduces the chances of choking and other complications, ultimately improving their outcome in an emergency.

Why is the Recovery Position So Important?

The recovery position offers a number of benefits for an unconscious person:

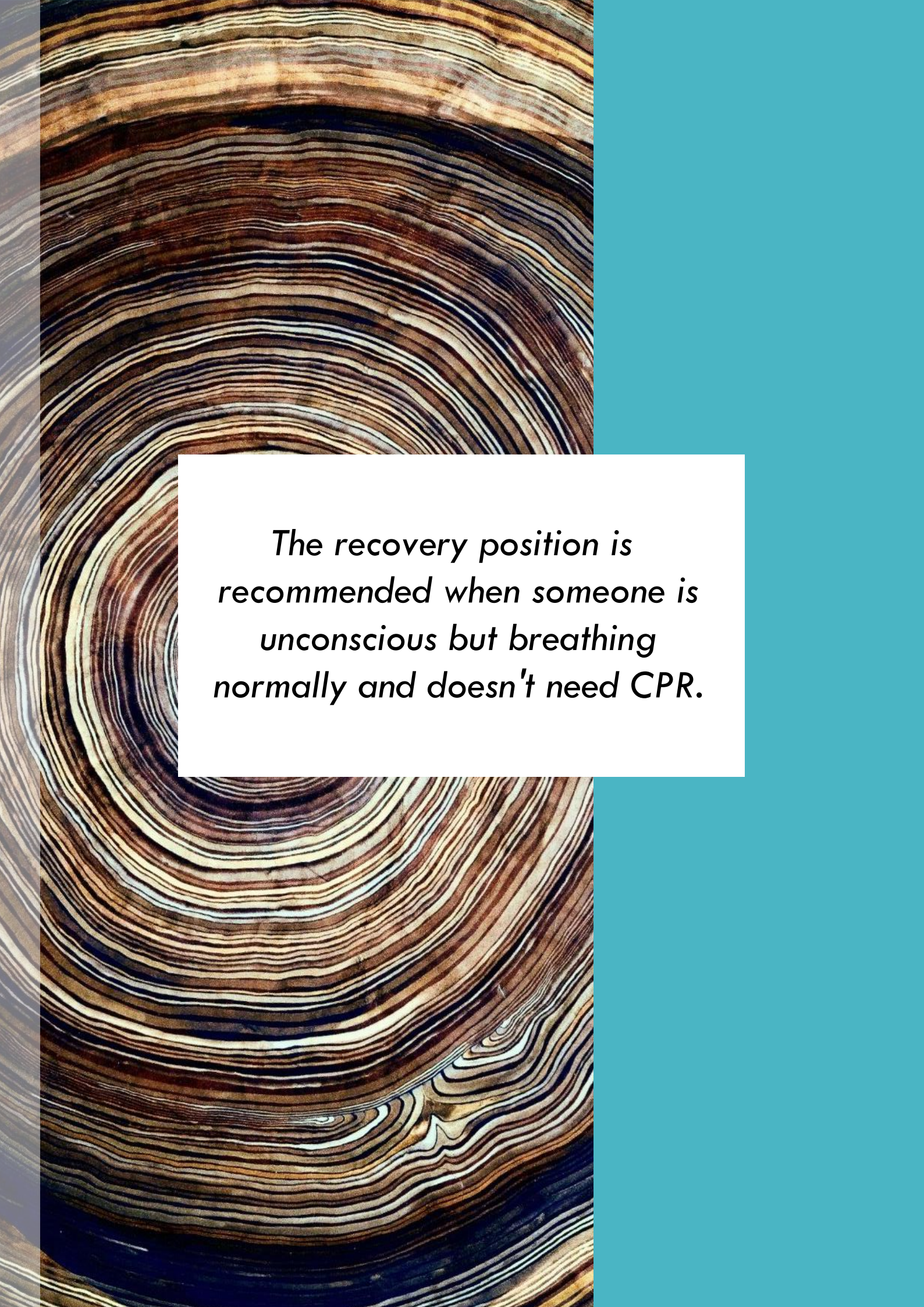
- ▶ **Keeps the airway open:** When someone is unconscious, their muscles relax, and their tongue can fall back and block their airway. The side-lying position helps prevent this.
- ▶ **Reduces the risk of choking:** It allows fluids like vomit or blood to drain out of the mouth, reducing the chance of choking or inhaling these fluids into the lungs (aspiration).
- ▶ **Improves blood flow:** The recovery position helps ensure good blood circulation to vital organs like the brain and heart, which is especially important in emergencies.
- ▶ **Eases pressure on the organs:** Lying on the side takes pressure off the diaphragm, making it easier to breathe.
- ▶ **Provides safety and comfort:** It prevents the person from rolling into a dangerous position and is generally more comfortable than lying flat on the back or stomach.
- ▶ **Makes monitoring easier:** It's easier to observe the person's breathing and check for any signs of distress when they're on their side.
- ▶ **Offers flexibility:** The recovery position can be adapted to suit a person's individual needs, injuries, or medical conditions.

When to Use the Recovery Position

The recovery position is recommended when someone is unconscious but breathing normally and doesn't need CPR. It's also useful after a seizure, during a hypoglycemic coma, or anytime someone's level of consciousness is reduced, but their normal breathing is preserved. If the person isn't breathing or has irregular breathing, start CPR immediately.

There are some situations where you shouldn't use the recovery position, such as when a spinal injury is suspected. In these cases, only move the person if their airway is blocked, and use a careful log-roll technique to keep their head and neck aligned.

The recovery position is a crucial first aid technique and it is so important!



The recovery position is recommended when someone is unconscious but breathing normally and doesn't need CPR.

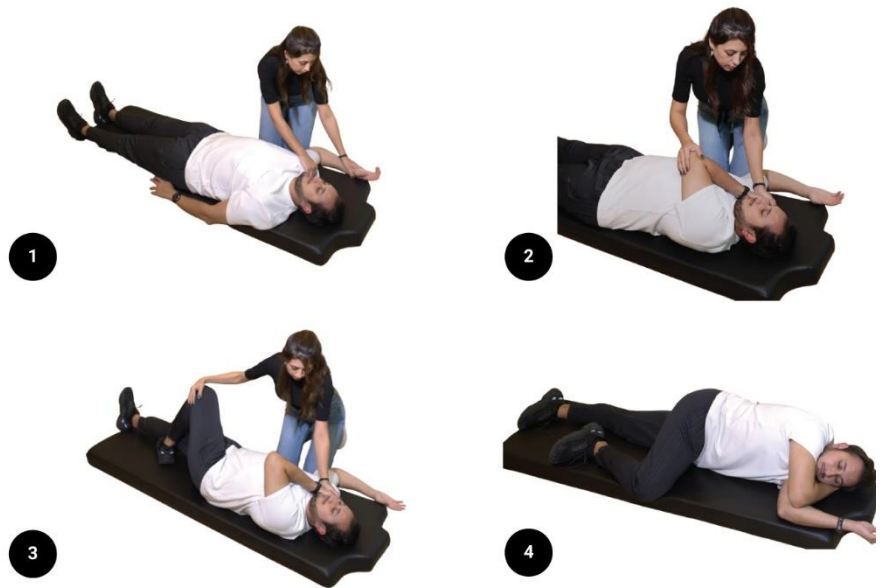


Figure. Procedure for recovery position

How to Place Someone in the Recovery Position

Here's how to safely place someone in the recovery position:

- ▶ Before approaching, make sure the area is safe for both you and the unconscious person.
- ▶ Gently tap the person and shout to see if they respond. If there's no response, call for emergency medical help.
- ▶ Tilt the head back slightly and lift the chin to make sure the tongue isn't blocking the airway. Check for breathing by looking, listening, and feeling for breaths.
- ▶ Extend the arm nearest to you at a right angle to their body, with the palm facing up. Bring the other arm across the chest and place the hand against the cheek on your side to support the head. Bend the leg farthest from you at the knee.
- ▶ Gently roll the person towards you onto their side, keeping the hand pressed against the cheek and the leg bent for support.
- ▶ Make sure the head is tilted back slightly to keep the airway open.
- ▶ Continuously check the person's breathing and vital signs until medical help arrives.

Which Side is Best?

The left lateral position (left side down) is generally preferred because it:

- ▶ Reduces pressure on the heart.
- ▶ Helps blood flow to vital organs.
- ▶ Makes it harder for stomach contents to regurgitate and be aspirated.

However, you might need to place the person on their right side if they have injuries on their left side or due to other factors in the environment. The most important thing is to keep the airway open and the person stable, regardless of which side they're on. There is no official recommendation in ERC guidelines for preferred side for Recovery position.

There is no official recommendation in ERC guidelines for preferred side for Recovery position.

Recovery Position for Infants

For infants, the position is slightly different. Cradle the infant in your arms with their head tilted downwards and on their side. This helps keep the airway open and allows fluids to drain. This position also leaves one of your hands free to call for help or perform back blows if needed.



Figure. Recovery position for an infant



Caring for someone in the recovery position is also important!

Caring for Someone in the Recovery Position

- ▶ If breathing becomes irregular or stops, roll them onto their back and start CPR immediately.
- ▶ Stay with the person and watch for any changes. You might need to turn them to the other side after 30 minutes to prevent pressure sores and help with blood flow.
- ▶ Make sure fluids can drain from the mouth, and the neck and back are in a neutral position.
- ▶ Keep the person in the recovery position until professional help arrives or they regain consciousness and can maintain their own airway.

Figure. Recovery position



Important Don'ts:

- ▶ Don't put anything in the person's mouth.
- ▶ Avoid unnecessary movements that could worsen injuries.
- ▶ Don't put anything under the person's head if they're lying on their back, as this could block the airway.

The recovery position is a crucial first aid technique and it is so important!



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Chapter 2.

Abdominal Thrust in Different Ages

Margarita Petrova Atanasova

Chapter 2. Abdominal Thrust in Different Ages

Abdominal thrust is a first aid technique we use to clear someone's airway when it's blocked by food or another small object. Choking can be very dangerous because it prevents oxygen from reaching the lungs and through circulation to the brain. If not treated quickly, it can lead to brain damage or even death. That's why it's so important for everyone, from medical professionals to non-medical people, to know how to recognize choking and perform the abdominal thrust properly.

Recognizing Choking

Choking happens when a foreign object, like a piece of food or a small toy, gets lodged in the airway. The blockage can be partial, meaning some air can still get through, or complete, meaning no air can pass. With a complete blockage, the person can quickly become unconscious and even experience cardiac arrest.

Here are some signs that someone might be choking:

- ▶ Clutching at their throat (this is the universal sign for choking)
- ▶ Having trouble speaking, coughing, or breathing
- ▶ Showing signs of distress and panic
- ▶ Making noisy breathing sounds like wheezing or gasping
- ▶ Developing a bluish or greyish colour to their skin, lips, or nails (cyanosis) from lack of oxygen
- ▶ Losing consciousness if the blockage isn't cleared

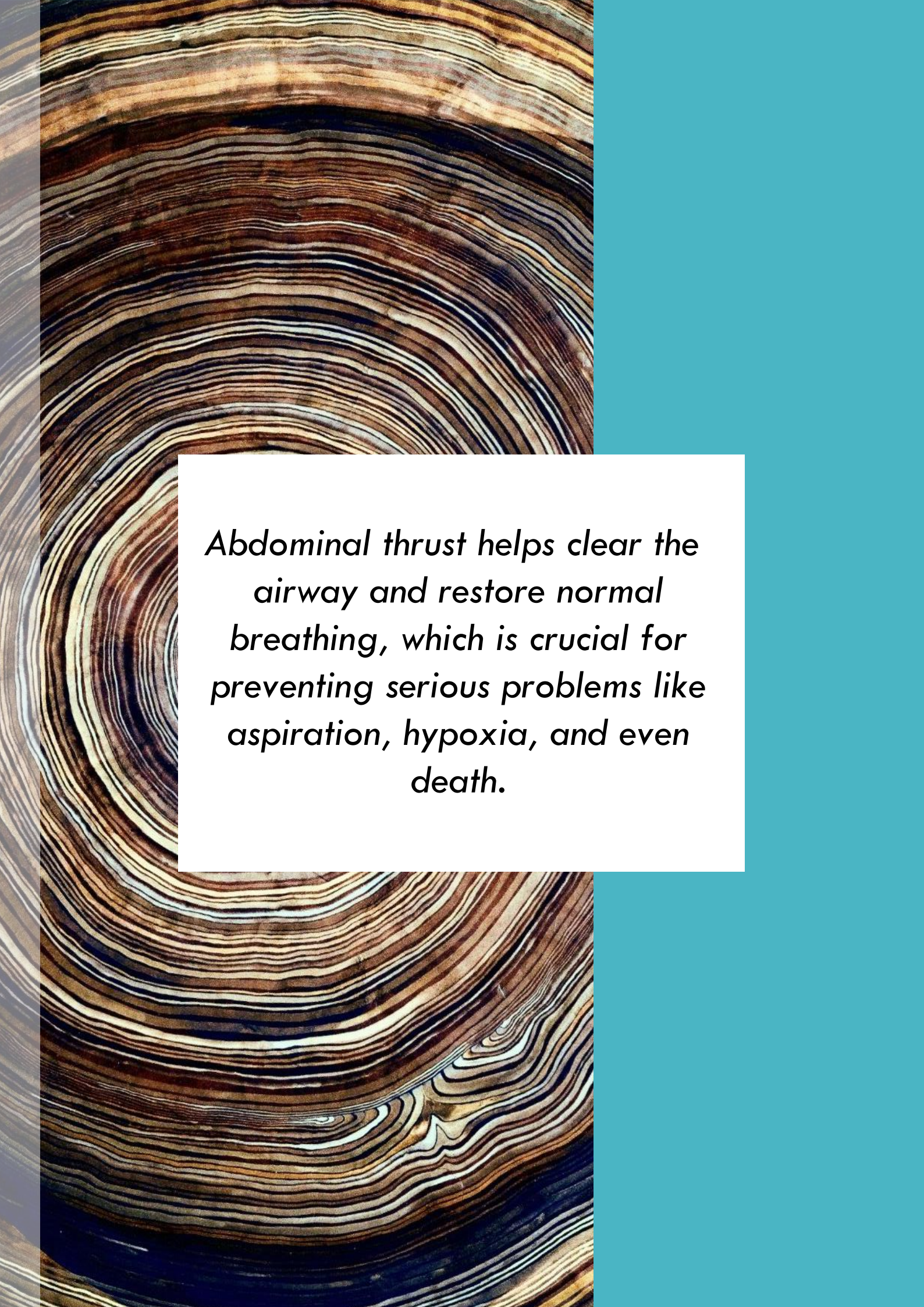
It's important to be able to tell the difference between choking and other medical emergencies that might look similar, like fainting, seizures, or heart attacks.

Why the Abdominal Thrust is Important

The Abdominal thrust helps clear the airway and restore normal breathing, which is crucial for preventing serious problems like aspiration (inhaling foreign material into the lungs), hypoxia (lack of oxygen), and even death. Here's how it works:

- ▶ The abdominal thrusts create pressure that helps to pop the object out of the airway, often allowing the person to breathe again immediately.
- ▶ The thrusts help to expel the object and allow air to flow normally to the lungs.
- ▶ By opening up the airway, the manoeuvre helps prevent aspiration, which can cause pneumonia or other lung infections.
- ▶ The abdominal thrust is relatively easy to learn and can be used in many different places.

Abdominal thrust is a first aid technique to clear someone's airway when it's blocked by food or another small object.



Abdominal thrust helps clear the airway and restore normal breathing, which is crucial for preventing serious problems like aspiration, hypoxia, and even death.

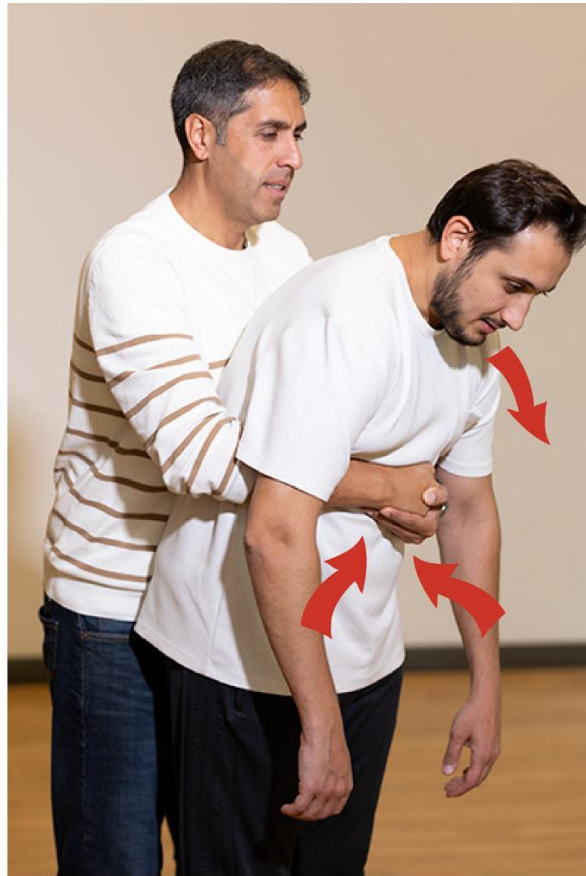


Figure. Abdominal thrust

Performing the Abdominal Thrust on Adults and Children Over One Year Old

- ▶ Stand behind the person who is choking and make sure they are upright.
- ▶ Make a fist with your dominant hand and place the thumb side against their abdomen, a bit above their belly button and well below the rib cage.
- ▶ Grasp your fist with your other hand and give quick inward and upward thrusts into the abdomen. This creates pressure in the chest, forcing air upward to help expel the object.
- ▶ Keep doing thrusts until the object is dislodged or the person becomes unconscious.

When Not to Use the Abdominal Thrust

- ▶ If the person is coughing forcefully and can speak or breathe, encourage them to keep coughing.
- ▶ If the person becomes unconscious, start CPR (chest compressions and rescue breaths) right away.
- ▶ For pregnant women, use chest thrusts instead of abdominal thrusts.
- ▶ Infants under one year old need a different approach with back blows and chest thrusts.

Pregnant women and infants are among the special considerations.

Special Considerations

- ▶ **Pregnant Women:** Perform chest thrusts instead of abdominal thrusts, with your hands positioned higher on the chest near the base of the breastbone. Use a gentler force and seek immediate medical attention even if you successfully clear the obstruction.
- ▶ **Infants:** Signs of choking in infants can include distress, not being able to cry, coughing, choking sounds, a bluish skin colour, and difficulty breathing. To give back blows and chest thrusts, place the infant face down on your forearm with their head lower than their body. Give five firm back blows between their shoulder blades. If the blockage is still there, turn the infant face up and do five chest thrusts using two fingers placed on the centre of their chest just below the nipple line. Keep alternating between back blows and chest thrusts until the infant becomes unconscious or the airway is clear. If the infant loses consciousness, call 112 and start infant CPR.

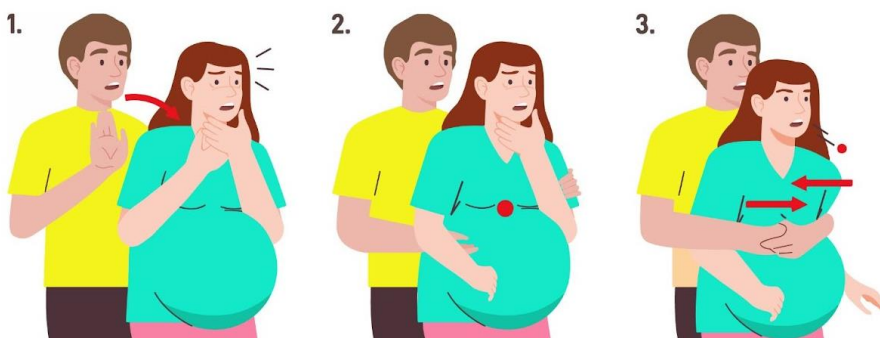


Figure. Abdominal thrust on pregnant individuals

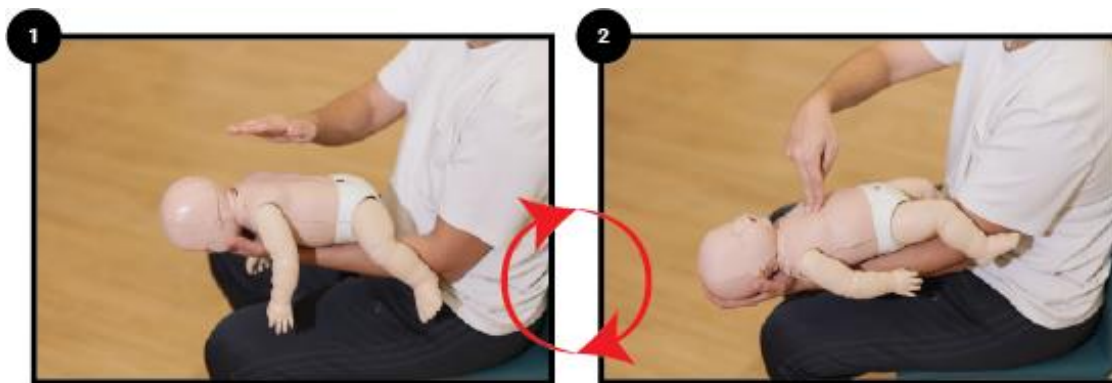


Figure. Choking relief in infant younger than age 1

What if someone becomes unconscious while choking?

If Someone Becomes Unconscious While Choking

- ▶ Call 112 for help right away.
- ▶ Check if the person is breathing. If they aren't breathing or their breathing is irregular, start CPR.
- ▶ Do 30 chest compressions followed by 2 rescue breaths. Continue this until help arrives or the person starts breathing normally.
- ▶ After each set of compressions, open the person's airway and look for any visible blockage in their mouth.

Figure. Abdominal thrust



Important Things to Remember

Although the abdominal thrusts can save lives, it's important to be aware of potential risks:

- ▶ Too much force can cause injuries, like broken ribs or damage to internal organs, especially in older adults.
- ▶ The thrusts might cause vomiting, which could lead to aspiration.
- ▶ Doing the manoeuvre incorrectly could make things worse or not clear the blockage at all.

Abdominal thrust is a first aid technique to clear someone's airway when it's blocked by food or another small object.



Chapter 3.

Basic Life Support in Young Adult Patients

Margarita Petrova Atanasova

Chapter 3. Basic Life Support in Young Adult Patients

Basic Life Support (BLS) is a crucial first-aid technique for anyone who has experienced sudden cardiac arrest. This happens when the heart abruptly stops beating, causing unconsciousness, abnormal or absent breathing, and no signs of blood circulation. Rapid and effective BLS helps maintain blood flow to vital organs, increasing the chances of survival and reducing the risk of complications.

Recognizing Cardiac Arrest

Early recognition of cardiac arrest is essential for quick action. Here's how to tell if someone might be in cardiac arrest:

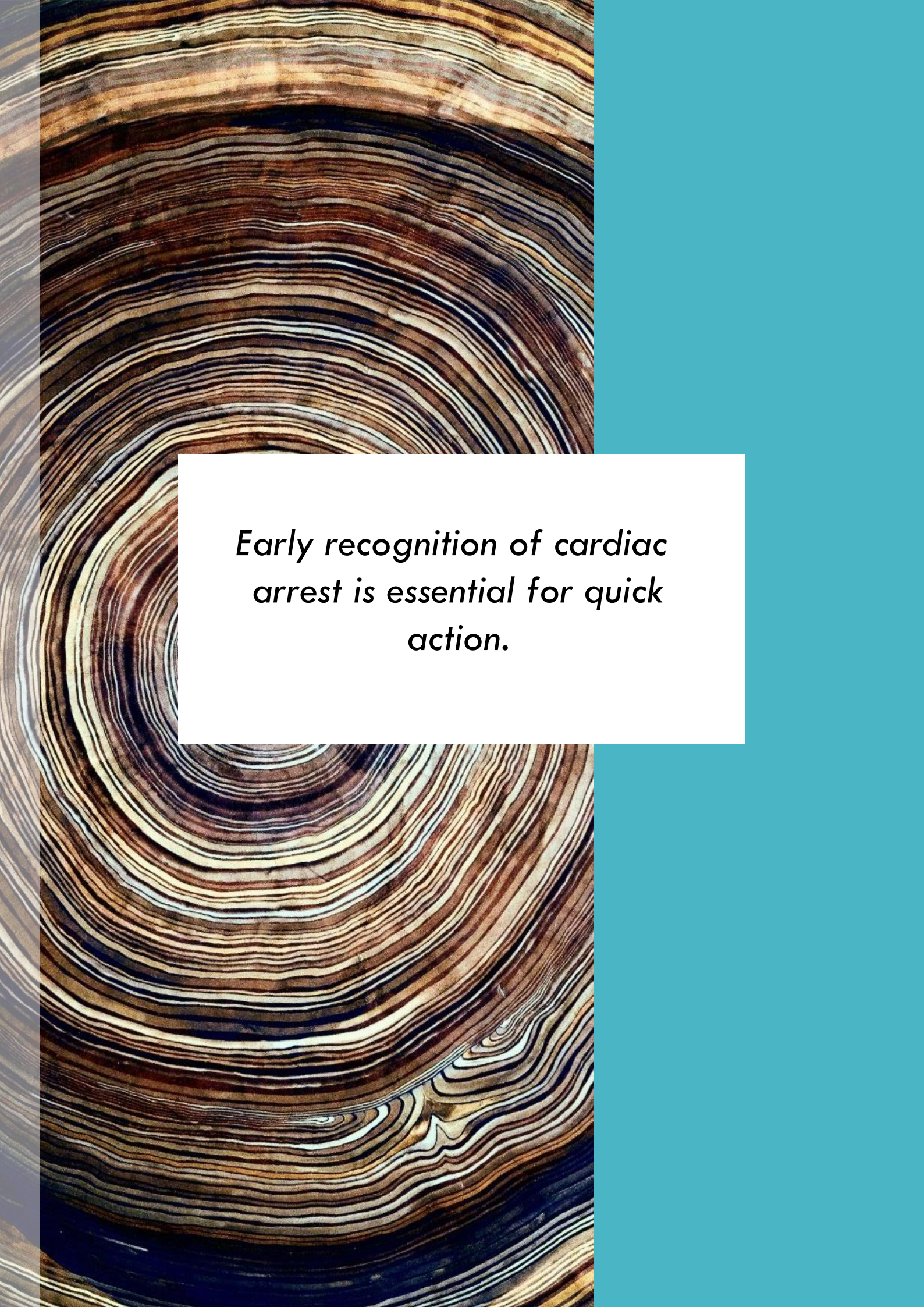
- ▶ Before approaching, ensure the environment is safe for both you and the person needing help. Look out for potential dangers like electrical wires, gas leaks, unstable structures, etc.
- ▶ Gently tap the person's shoulder and ask, "Are you okay?" If there's no response, proceed to the next step.
- ▶ Open the airway using the head-tilt/chin-lift technique (place one hand on the forehead to tilt the head back slightly and use the other hand to lift the chin). Look, listen, and feel for breathing for at least 10 seconds.
- ▶ If the person isn't breathing or is only gasping, assume they're in cardiac arrest. Call 112 (or your local emergency number) immediately and start CPR.

Calling for Help

When calling 112 from a mobile phone, be ready to provide this information:

- ▶ Clearly state that you need an ambulance.
- ▶ Give the exact location, including any landmarks that might help the ambulance find you.
- ▶ Describe the person's condition as unconscious and not breathing normally.
- ▶ Follow the dispatcher's instructions and, if possible, ask someone nearby to locate an AED (automated external defibrillator).

Basic Life Support (BLS) is a crucial first-aid technique for anyone who has experienced sudden cardiac arrest.



Early recognition of cardiac arrest is essential for quick action.



Figure. Chest compressions and rescue breaths during CPR

Starting CPR - The C-A-B Approach

BLS involves three main steps, with chest compressions being the most important to maintain blood circulation:

- ▶ **C (Chest Compressions):** Start chest compressions without delay. Place the heel of one hand in the centre of the chest (on the lower half of the breastbone), and put your other hand on top, interlacing your fingers. Press down at least 2 inches (5 cm) but no more than 2.4 inches (6 cm) at a rate of 100-120 compressions per minute. Allow the chest to fully recoil after each compression to help blood return to the heart.
- ▶ **A (Airway):** After 30 compressions, open the airway again with the head-tilt/chin-lift technique.
- ▶ **B (Breathing):** Give two rescue breaths, each lasting about one second, and watch for the chest to rise. Minimize any pauses between compressions (less than 10 seconds).

Continue cycles of 30 compressions and 2 breaths until professional help arrives or the person shows signs of life.

The Chain of Survival

The "Chain of Survival" describes the key actions that improve the chances of surviving cardiac arrest:

- ▶ Quickly recognizing cardiac arrest and activating EMS is essential.
- ▶ Starting CPR immediately helps keep blood and oxygen flowing.
- ▶ Using an AED to deliver a shock can help restore a normal heart rhythm.
- ▶ EMS provides more advanced medical treatment, including medications and airway management.
- ▶ Ongoing medical care after the cardiac arrest helps ensure the best possible recovery.

The "Chain of Survival" describes the key actions that improve the chances of surviving cardiac arrest.

Using an AED

AEDs are portable devices that can analyse the heart's rhythm and deliver a shock if necessary. If an AED is available:

- ▶ Turn it on and follow the instructions, which will be shown on a screen or given as voice prompts.
- ▶ Attach the electrode pads to the person's bare chest, one on each side, as shown on the AED.
- ▶ Let the AED analyse the heart rhythm. Make sure no one is touching the person while it's analysing or delivering a shock.
- ▶ If a shock is advised, press the shock button to deliver it.
- ▶ Immediately resume CPR after a shock or if no shock is advised.

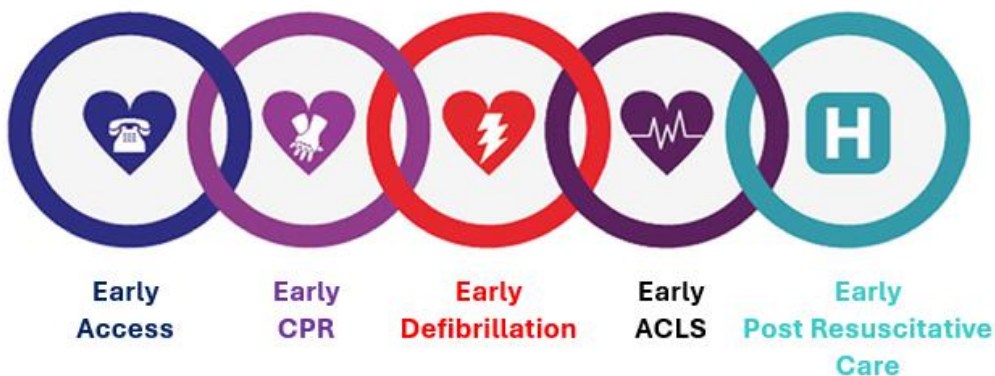


Figure. Chain of survival



How to effective chest compressions?

Effective Chest Compressions

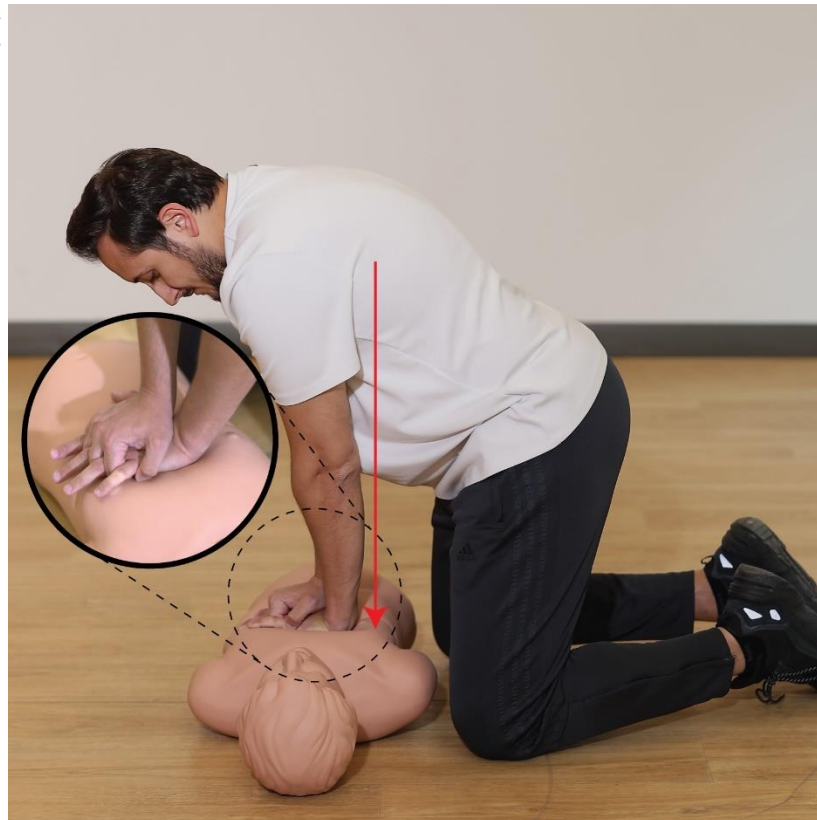
To make CPR most effective:

- ▶ **Rate and depth:** Aim for a compression rate of 100-120 compressions per minute and a depth of 2-2.4 inches (5-6 cm).
- ▶ **Minimize interruptions:** Keep chest compressions continuous with minimal pauses. This allows for proper chest recoil and better blood flow.
- ▶ **Rescuer fatigue:** If you can, switch rescuers every two minutes to prevent fatigue and maintain good quality compressions.

Breathing and Ventilation

- ▶ Open the airway using the head-tilt/chin-lift manoeuvre.
- ▶ Give rescue breaths by sealing your lips around the person's mouth, pinching their nose closed, and breathing into their mouth until you see the chest rise.
- ▶ If you have one, use a pocket mask to reduce direct contact and improve ventilation.

Figure. Position of the rescuer for high-quality chest compressions



When to Stop CPR

Only stop CPR if:

- ▶ Open the airway using the head-tilt/chin-lift manoeuvre.
- ▶ Give rescue breaths by sealing your lips around the person's mouth, pinching their nose closed, and breathing into their mouth until you see the chest rise.
- ▶ If you have one, use a pocket mask to reduce direct contact and improve ventilation.

Basic Life Support (BLS) is a crucial first-aid technique for anyone who has experienced sudden cardiac arrest.



Chapter 4.

Paediatric Basic Life Support

Gergana Ivanova

Chapter 4. Paediatric Basic Life Support

Paediatric Basic Life Support (BLS) is crucial for responding to cardiac arrest in children. Unlike adults, where cardiac arrest is often caused by heart conditions like coronary artery disease, cardiac arrest in children usually stems from non-cardiac issues like respiratory failure. Effective BLS is essential for improving survival rates and outcomes in these paediatric emergencies.

Types of Cardiac Arrest in Children

The most common type of cardiac arrest in infants and children is hypoxic/asphyxial arrest. This happens when the body's tissues gradually lose oxygen and become acidic due to breathing difficulties or shock. Several things can cause this, including severe allergic reactions (anaphylaxis), blocked airways, pneumonia, metabolic problems like low blood sugar or electrolyte imbalances, neurological events like brain herniation, poisoning, and trauma.

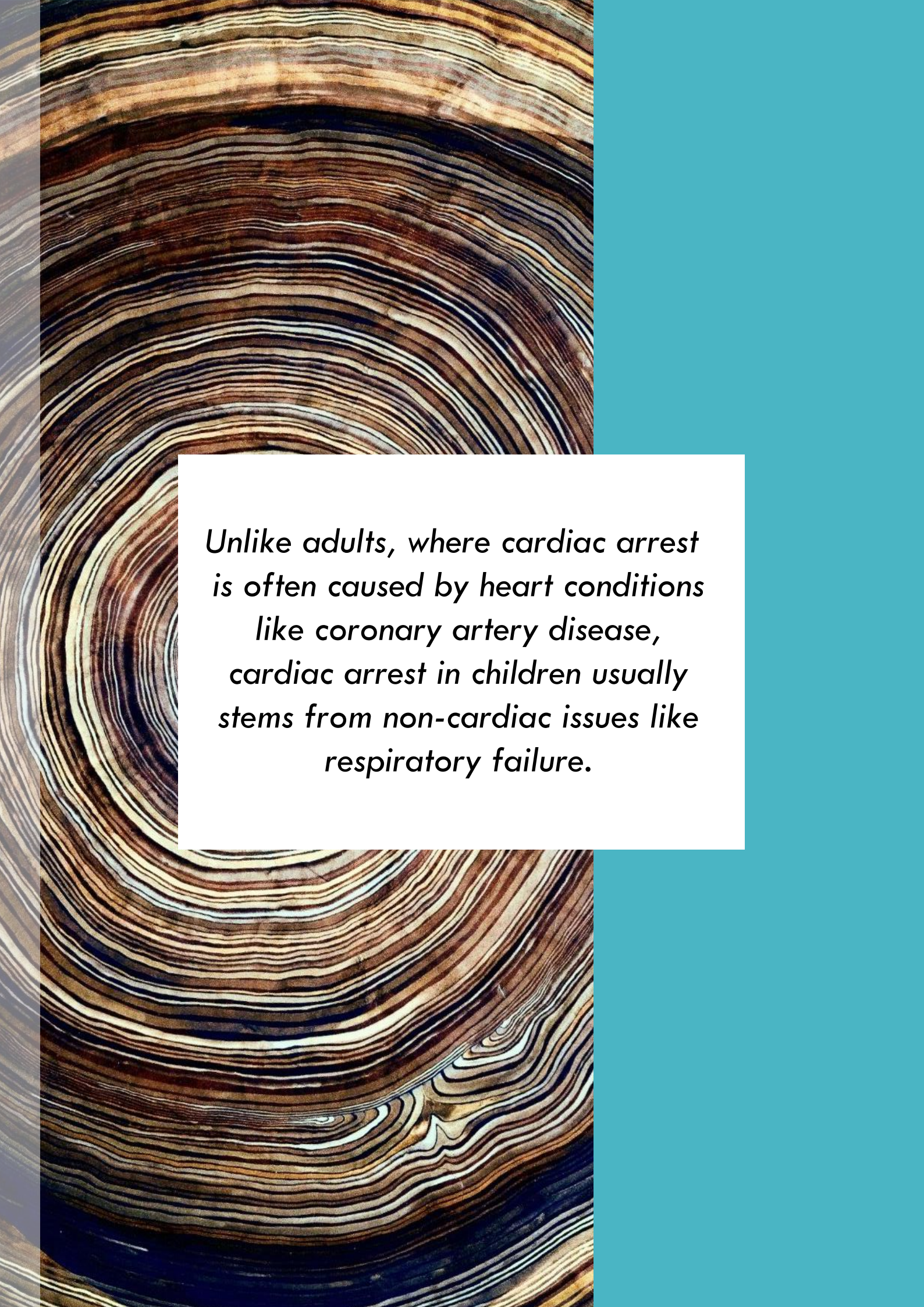
Sudden cardiac arrest, while less frequent in children, usually involves irregular heart rhythms like ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT). Some factors that increase the risk of sudden cardiac arrest in children include heart conditions like hypertrophic cardiomyopathy, myocarditis, coronary artery abnormalities, Wolff-Parkinson-White syndrome, and long QT syndrome, as well as drug toxicity and commotio cordis (sudden cardiac arrest triggered by a blow to the chest).

Recognizing and responding to paediatric cardiac arrest quickly is vital, especially since it often follows respiratory arrest (when breathing stops). Children who experience respiratory arrest have a much better outlook than those who have a cardiac arrest. For instance, the one-year survival rate for children with out-of-hospital respiratory arrest is around 82%, while it's only about 14% for those with cardiac arrest.

Age Categories for CPR

- ▶ **(Infants)** Less than one year old
- ▶ **(Children)** One year old until puberty or weighing 55 kg (approximately 121 lbs)
- ▶ **(Adolescents and Adults)** BLS protocols for adults are used when a child weighs more than 55 kg or has reached puberty.

Paediatric Basic Life Support (BLS) is crucial for responding to cardiac arrest in children.



Unlike adults, where cardiac arrest is often caused by heart conditions like coronary artery disease, cardiac arrest in children usually stems from non-cardiac issues like respiratory failure.

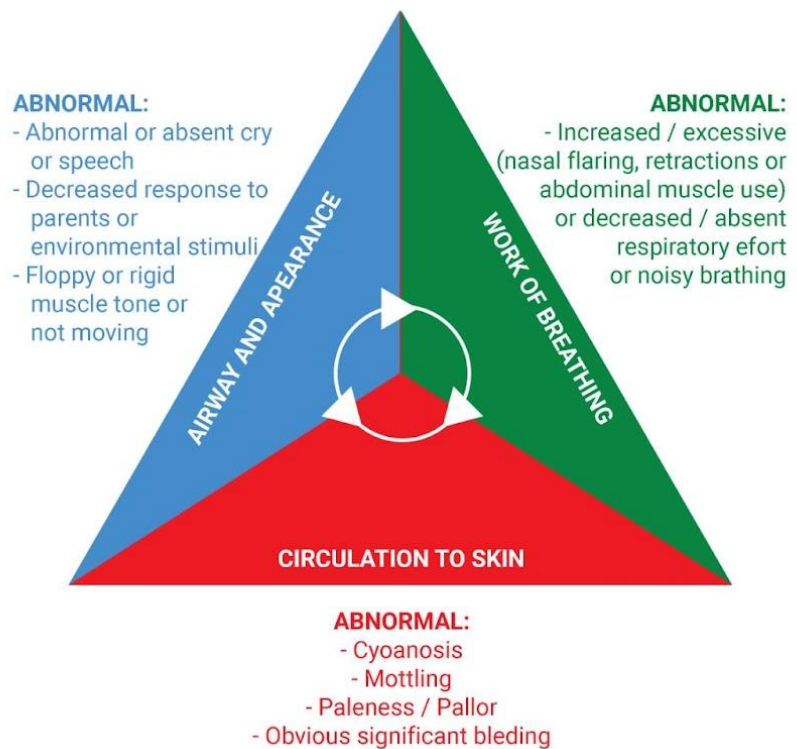


Figure. Paediatric Assessment Triangle

Recognizing Cardiac Arrest in Children

Early signs of cardiac arrest in a child might include:

- ▶ Chest pain, especially during exercise
- ▶ Dizziness, fainting, or a racing heartbeat, with or without exertion
- ▶ Unexplained fatigue or shortness of breath during exercise
- ▶ Decreased ability to tolerate physical activity

The Paediatric Assessment Triangle (PAT)

The PAT is a quick assessment tool that uses visual and listening cues to evaluate a child's condition:

- ▶ Observe the child's responsiveness, muscle tone, and the quality of their cry (if applicable).
- ▶ Listen for signs of laboured breathing or abnormal sounds like grunting or stridor.
- ▶ Look for any discoloration of the skin, changes in skin tone, and check capillary refill time (how quickly the colour returns to the skin after pressing on it).

The PAT helps healthcare providers quickly assess the severity of a child's illness, identify any problems with their vital systems, and determine the need for treatment.

The ABCDE Approach

- ▶ **A (Airway):** Ensure the airway is open and unobstructed.
- ▶ **B (Breathing):** Assess breathing by checking oxygen saturation, the tidal volume, respiratory rate, and signs of dyspnea or increased work of breathing muscles.
- ▶ **C (Circulation):** Check for signs of life, such as breathing, movement, or coughing. Check the pulse (brachial pulse in infants, carotid pulse in children) for no more than 10 seconds.
- ▶ **D (Disability):** Assess the child's level of consciousness using the AVPU scale (Alert, Verbal, Pain, Unresponsive).
- ▶ **E (Exposure):** Examine the child from head to toe to identify any injuries or signs that might indicate the cause of their illness.

Give compressions at a rate of 100-120 compressions per minute with a compression-to-ventilation ratio of 15 compressions to 2 breaths.

Rescue Breaths and Airway Management

- ▶ For children, tilt the head slightly past a neutral position while lifting the chin. For infants, keep the head in a neutral position. If a neck injury is suspected, only use a chin lift or jaw thrust to open the airway.
- ▶ If a child isn't breathing, give five initial rescue breaths. For infants, cover both the mouth and nose with your mouth. For children over one year old, pinch the nose closed and give mouth-to-mouth breaths.
- ▶ If you have trouble giving breaths, check for any visible obstructions, reposition the head, and ensure proper chin lift and head tilt..



Figure. Head tilt, chin lift in children and infant



Chest Compressions

Start chest compressions if the child shows no signs of circulation or has a weak pulse (less than 60 beats per minute) with signs of poor perfusion. Compressions should be one-third the depth of the chest, to a maximum depth of 6 centimetres (about 2.4 inches).

- ▶ **Infants** (less than one year old): Use two fingers for compressions if there's only one rescuer, or use the encircling thumbs technique if there are two rescuers.
- ▶ **Children** (over one year old): Use the heel of one hand (or two hands for larger children) to compress the lower third of the breastbone.

Give compressions at a rate of 100-120 compressions per minute with a compression-to-ventilation ratio of 15 compressions to 2 breaths.

Using an AED

- ▶ For children 8 years and older, use a standard AED.
- ▶ For children younger than 8 years, use a paediatric pad or setting if available. If not, a standard AED can be used but adjust pad placement to avoid the charge arcing between them.

Here are the steps for using an AED:

- ▶ Turn on the AED.
- ▶ Apply the pads to the child's chest.
- ▶ Let the AED analyse the heart rhythm.
- ▶ Deliver a shock if instructed by the AED.
- ▶ Immediately resume CPR for two minutes, then check the rhythm again.

Figure. Chest compression in infants two fingers technique

Figure. Chest compression in infants encircling technique



BLS Algorithm

1. Ensure your own safety.
2. Check for responsiveness.
3. Activate EMS and open the airway.
4. Give five rescue breaths if the child isn't breathing.
5. Check for signs of circulation (pulse and breathing).
6. Start chest compressions if there are no signs of circulation.
7. Use an AED if available.

Continue BLS until the child's circulation returns, professional help arrives, or you become too exhausted to continue

*Paediatric Basic Life Support (BLS)
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