



First Aid



Klinika anesteziologie, resuscitace a intenzivní medicíny
Univerzita Karlova, Lékařská fakulta v Hradci Králové
Fakultní nemocnice Hradec Králové

Dept. of Anaesthesiology and Intensive Care Medicine
Charles University, Faculty of Medicine
University Hospital Hradec Kralove





- Basic Life Support (BLS)
- Basic differences in children
- Foreign body aspiration
- QR codes to learning videos





**KLINIKA ANESTEZIOLOGIE,
RESUSCITACE A INTENZIVNÍ MEDICÍNY**
FAKULTNÍ NEMOCNICE HRADEC KRÁLOVÉ



Basic Life Support (BLS)

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Basic Life Support (Reanimation, Cardiopulmonary Resuscitation)



- Complex of actions securing blood delivery to vital organs in case of failure of vital functions (breathing, circulation)
- Aim of cardiopulmonary resuscitation
 - Oxygen delivery to vital organs in case of failure of breathing and circulation (cardiac arrest)
 - Return of spontaneous circulation and breathing (ROSC)



Cardiopulmonary Resuscitation



■ Basic Life Support

- Provided by both lay rescuers and health care professionals
- No aids used
- Use of Automated External Defibrillators (AED)
- Civil duty to act

■ Advanced Life Support

- Provided by health care professionals
- Special procedures
- Use of aids, devices, drugs



Resuscitation - summary



- Cardiac arrest is the leading cause of death in patients over 40 years of age
 - Myocardial infarction is the most frequent cause
- Only 10%-15% of patients leave hospital without impairment
 - Self-sufficiency
 - No neurological impairment
- Every minute since cardiac arrest decreases the chances of survival
 - By 10-12%/min, in case no resuscitation is provided
 - By 3-4%/min, in case resuscitation is provided



Resuscitation - summary

- Average call-to-arrival time is 5-10 min for EMS
 - In cities
 - In remote regions up to 20 minutes
- The most important items for survival are lay rescuer resuscitation (BLS) and presence of trained rescuer who is able, equipped, willing, and prepared to provide resuscitation
- Use of automated external defibrillator increases chances of survival even more significantly

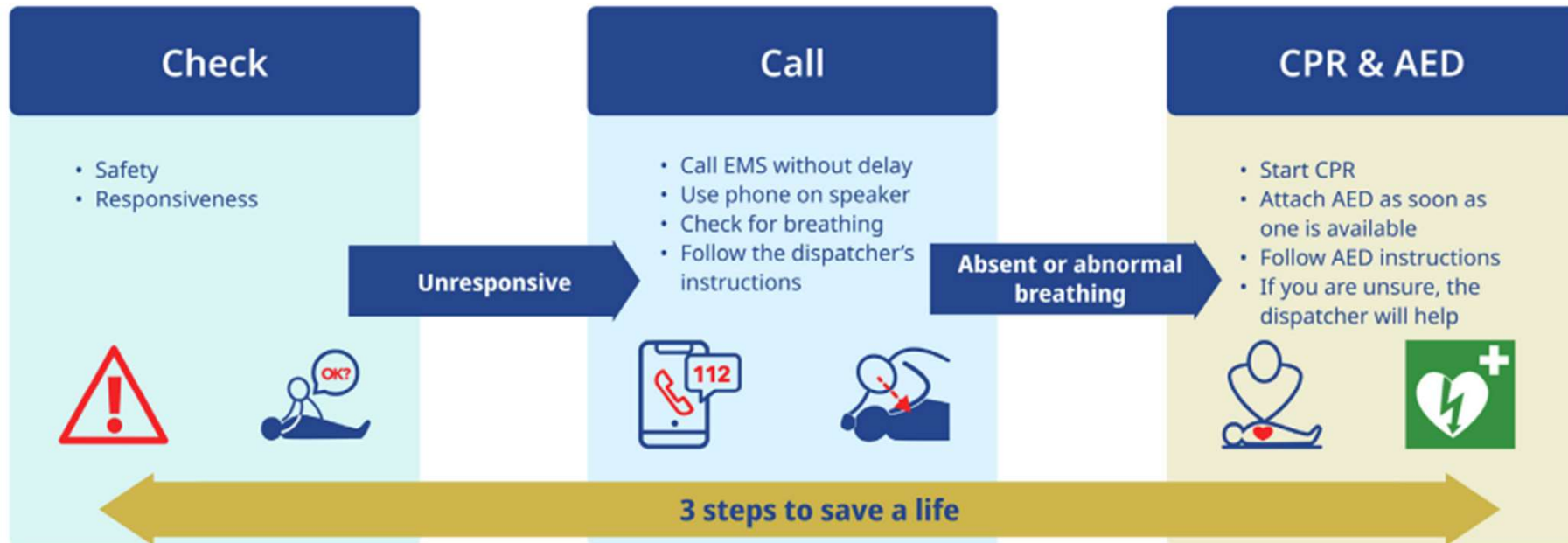


Resuscitation - summary

- Attempt to simplify the procedure
 - Simple rules
 - Easy to remember

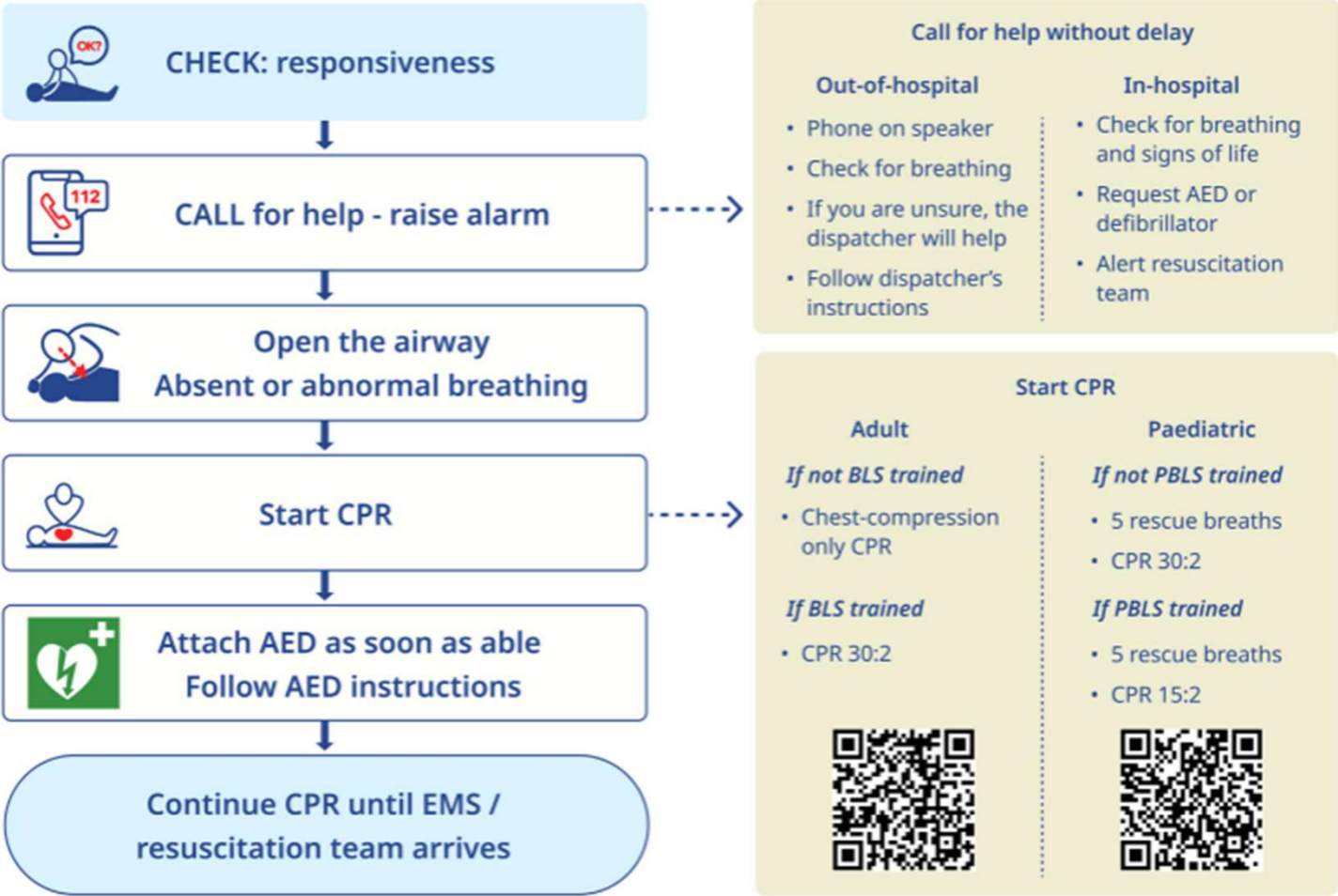
- Attempt to maximize chest compressions
 - Minimize individual inhibitions
 - At least something is being done
 - BLS without rescue breathing

Basic Life Support



Three steps to save a life.

Basic Life Support

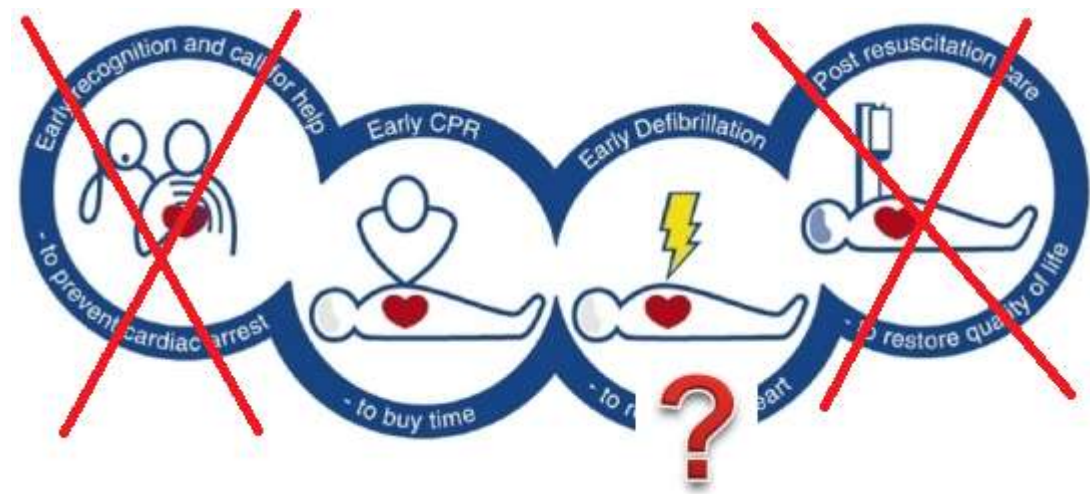


Universal BLS algorithm.



Chain of Survival

- Prevention of cardiac arrest
- Early resuscitation
- Early defibrillation
- BLS



Basic Life Support

Check safety first!!

Mind safety of all the participants prior to starting any activities...



Basic Life Support

- Check responsiveness
 - Address the person
„Are you OK?“
 - If the person is unresponsive
shake gently the shoulder
 - In case of no response
call for help, if possible

- Immediately activate loud speaker on your phone and call 112 if the patient is not responsive



Fig. 8b – Check.



Fig. 8c – Unconscious – Call.

Basic Life Support

- Check for breathing while calling 112



Fig. 8d – Check for breathing – open the airway.

Basic Life Support

- Check breathing
 - Check whether the person is breathing
 - Head tilt, chin lift
 - Look, listen, and feel
 - Regular movements of the chest
 - Breathing sounds
 - Exhaled flow of air on your cheek

- Make sure normal breathing is present
 - Gaspings (agonal breathing) is sign of cardiac arrest
 - Any abnormal breathing can be considered as sign of cardiac arrest



Fig. 8e – Not breathing normally.

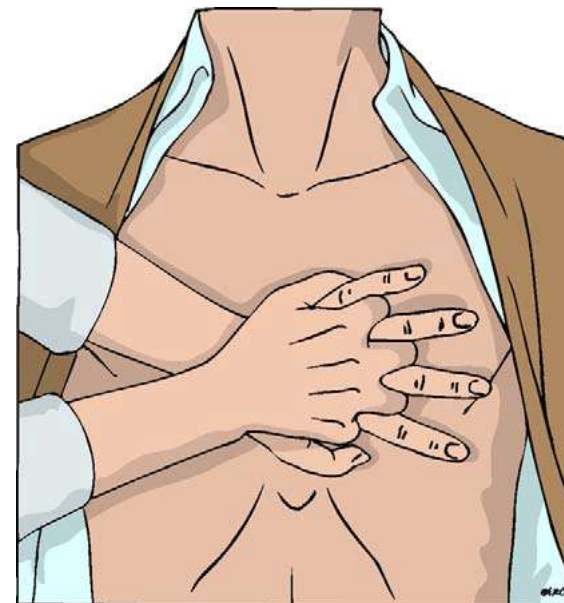
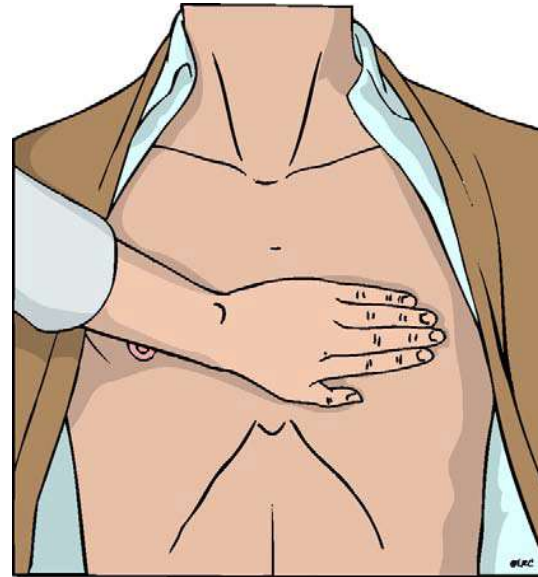
Chest Compressions

- Chest compressions: ventilation ratio 30:2
- In the center of the chest
- Frequency 100 – 120/min
- Depth 5 – 6 cm
- Change rescuers every 2 minutes
 - Fatigue



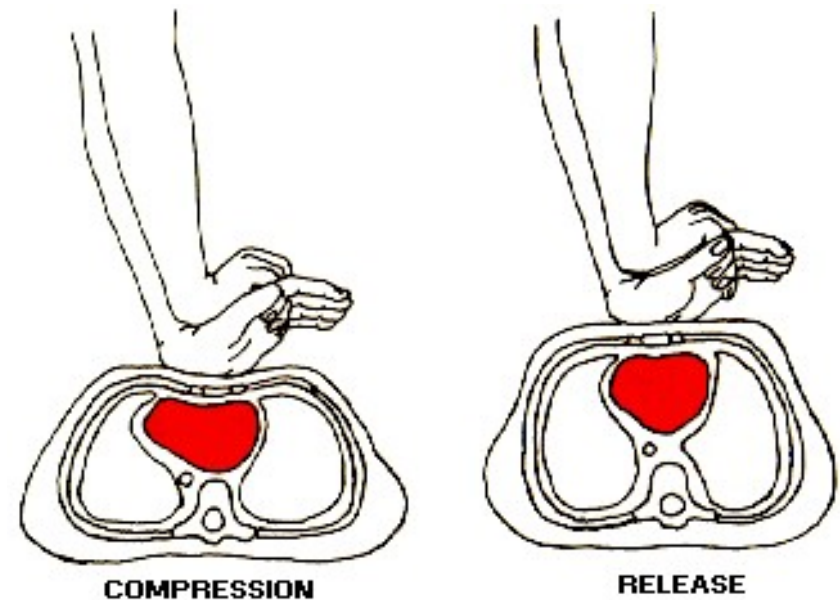
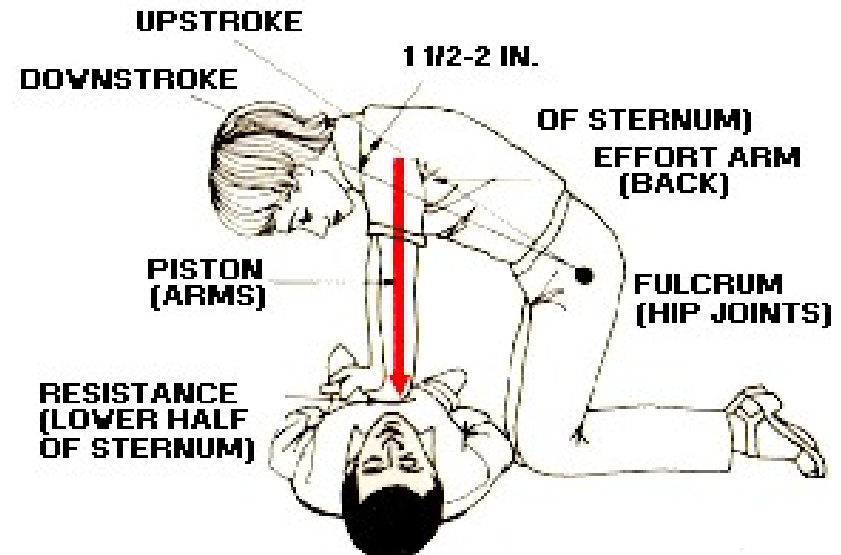
Chest Compressions - technique

- Place the heel of one hand on the center of the chest
- Place the heel of your other hand on top of the first hand, interlock the fingers
 - The fingers should not touch the chest



Chest Compressions - technique

- Position yourself vertically above the chest, with arms straight
- Keep lower back firm
- Movement origins at hips
- Press down on the sternum 5—6 cm
- After each compression, release all the pressure on the chest



Chest Compressions - technique



Ventilation – rescue breathing

- Mouth to mouth breathing
 - Mouth to nose
 - Mouth to mouth and nose
 - Mouth to mouth with special aids
 - Resuscitation mask
 - Resuscitation barrier device

- 30 chest compressions : 2 breaths

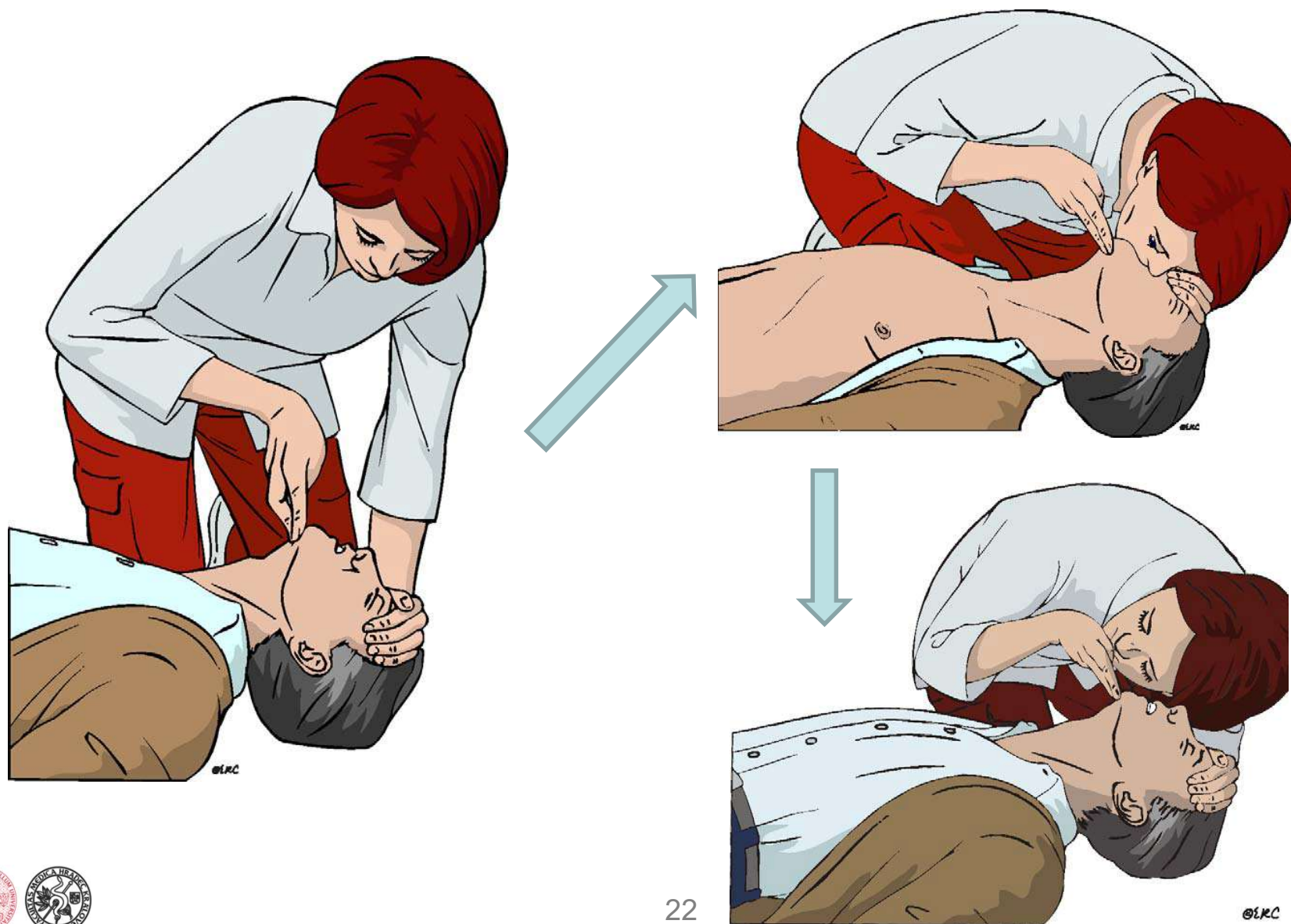
Mouth to mouth breathing - technique



- Head tilt and chin lift
- Pinch the soft part of the nose closed, using the index finger and thumb of your hand on the forehead
- Take a normal breath and place your lips around his the mouth, making sure that you have a good seal
- Blow steadily into the mouth while watching for the chest to rise, taking about 1 s as in normal breathing
- Maintaining head tilt and chin lift, take your mouth away from the victim and watch for the chest to fall as air passes out
- Never repeat unsuccessful breaths, continue chest compressions



Mouth to mouth breathing - technique

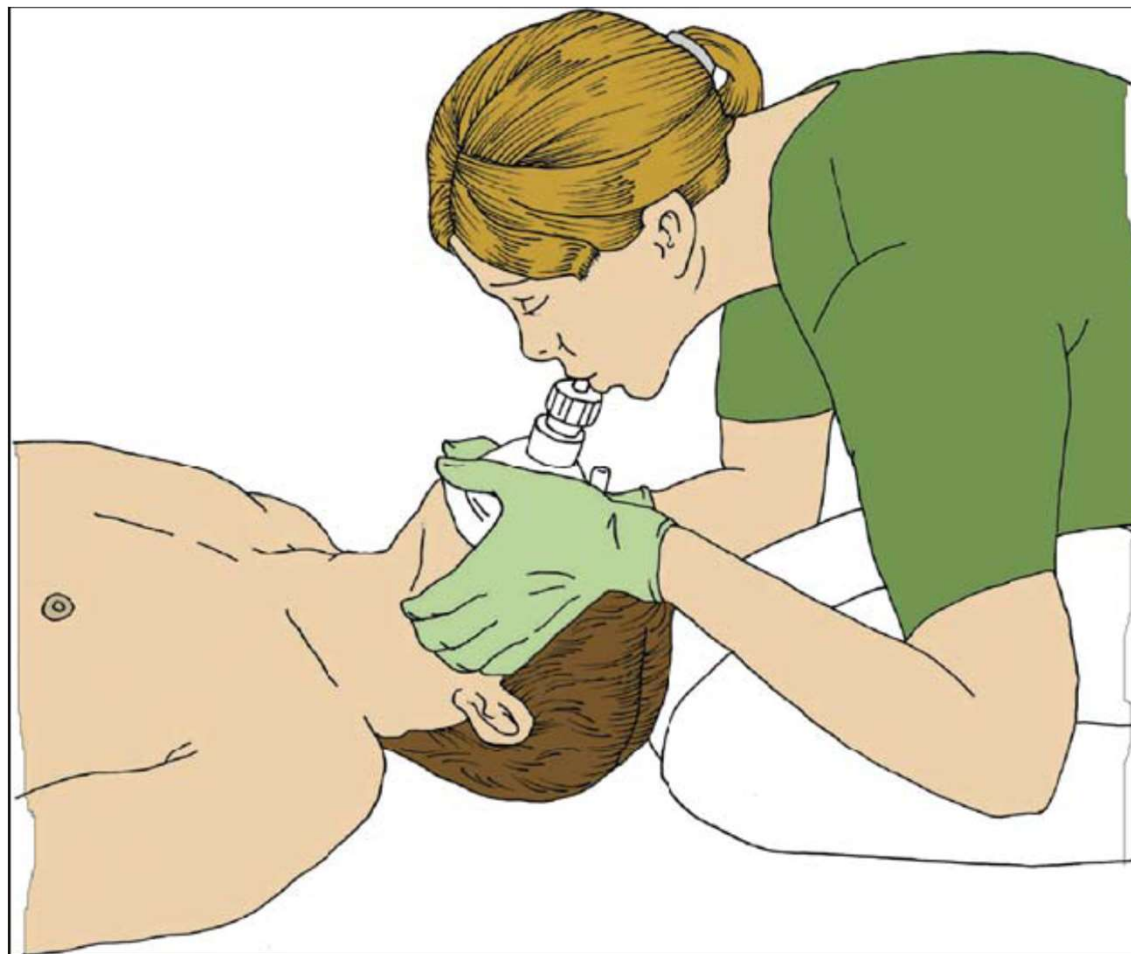


Rescue breathing – resuscitation mask

- Former compulsory part of first aid-kit in cars
- Includes valve preventing reverse flow of air from the victim
 - Prevention of infection




Rescue breathing – resuscitation mask





Resuscitation without mouth to mouth breathing

- Chest compressions only
- Allowable in persons that are not trained or willing to provide mouth to mouth breathing
 - Transfer of infection
 - Unknown person
 - Hygienic reasons
 - Do at least something
- Provide continuous chest compressions with frequency 100 – 120/min






SEQUENCE / ACTION		TECHNICAL DESCRIPTION
SAFETY		<ul style="list-style-type: none"> Make sure that you, the victim and bystanders are safe
RESPONSE Check for a response		<ul style="list-style-type: none"> Shake the victim gently by the shoulders and ask loudly: <i>"Are you all right?"</i>
ALERT EMERGENCY SERVICES		<ul style="list-style-type: none"> If victim is unresponsive, ask a helper to call the emergency medical services or call them yourself Stay with the victim if possible Activate the speaker function or hands-free option on the telephone so that you can start CPR whilst talking to the dispatcher
AIRWAY Open the airway		<ul style="list-style-type: none"> If there is no response, position the victim on their back With your hand on the forehead and your fingertips under the point of the chin, gently tilt the victim's head backwards, lifting the chin to open the airway
BREATHING Look, listen and feel for breathing		<ul style="list-style-type: none"> Look, listen and feel for breathing for no more than 10 seconds A victim who is barely breathing, or taking infrequent, slow and noisy gasps, is not breathing normally
SEND FOR AED Send someone to get an AED		<ul style="list-style-type: none"> Send someone to find and bring back an AED, if available If you are on your own, fetch an AED only if you can get and apply it within one minute; otherwise, start CPR immediately

<p>CIRCULATION Start chest compressions</p> 	<ul style="list-style-type: none"> • Kneel by the side of the victim • Place the heel of one hand in the centre of the victim's chest - this is the lower half of the victim's breastbone (sternum) • Place the heel of your other hand on top of the first hand and interlock your fingers • Keep your arms straight • Position yourself vertically above the victim's chest and press down on the sternum at least 5 cm (but not more than 6 cm) • After each compression, release all the pressure on the chest without losing contact between your hand and the chest • Repeat at a rate of 100-120 min⁻¹
<p>COMPRESSION-ONLY CPR</p> 	<ul style="list-style-type: none"> • If you are untrained, or unable to give rescue breaths, give chest-compression-only CPR (continuous compressions at a rate of 100-120 min⁻¹)

COMBINE RESCUE BREATHING WITH CHEST COMPRESSIONS



- If you are trained to do so, after 30 compressions, open the airway again, using head tilt and chin lift
- Pinch the soft part of the nose closed, using your index finger and thumb of your hand on the forehead
- Allow the victim's mouth to open, but maintain chin lift
- Take a normal breath and place your lips around the victim's mouth, making sure that you have an airtight seal
- Blow steadily into the mouth whilst watching for the chest to rise, taking about 1 second as in normal breathing. This is an effective rescue breath
- Maintaining head tilt and chin lift, take your mouth away from the victim and watch for the chest to fall as air comes out
- Take another normal breath and blow into the victim's mouth once more to achieve a total of two rescue breaths
- Do not interrupt compressions by more than 10 seconds to deliver the two breaths, even if one or both are not effective
- Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions
- Continue with chest compressions and rescue breaths in a 30:2 ratio

<p>WHEN AED ARRIVES Switch on the AED and attach the electrode pads</p> 	<ul style="list-style-type: none"> • As soon as the AED arrives, switch it on and attach the electrode pads to the victim's bare chest • If more than one rescuer is present, CPR should be continued whilst the electrode pads are being attached to the chest
<p>FOLLOW THE SPOKEN/ VISUAL DIRECTIONS</p>	<ul style="list-style-type: none"> • Follow the spoken and visual directions given by the AED • If a shock is advised, ensure that neither you nor anyone else is touching the victim • Push the shock button as directed • Then immediately resume CPR as directed by the AED
<p>IF NO SHOCK IS ADVISED Continue CPR</p> 	<ul style="list-style-type: none"> • If no shock is advised, immediately resume CPR and continue as directed by the AED
<p>IF NO AED IS AVAILABLE Continue CPR</p> 	<ul style="list-style-type: none"> • If no AED is available, or whilst waiting for one to arrive, continue CPR • Do not interrupt resuscitation until: <ul style="list-style-type: none"> • A healthcare professional tells you to stop OR • The victim is definitely waking up, moving, opening eyes, and breathing normally OR • You become exhausted • It is rare for CPR alone to restart the heart. Unless you are certain that the victim has recovered, continue CPR • Signs that the victim has recovered <ul style="list-style-type: none"> • Waking-up • Moving • Opening eyes • Breathing normally

AED

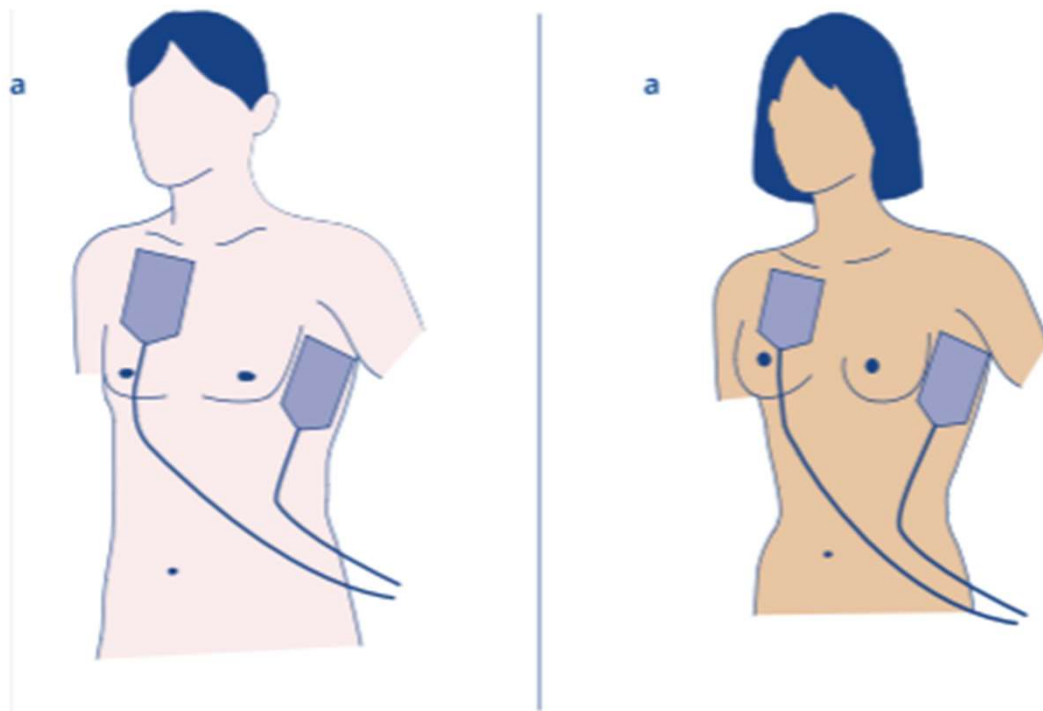
- Defibrillation is not determined for all cardiac arrest victims
- In indicated cases, an electric shock (defibrillation) should be delivered by AED early, before RMS arrives
 - Designed and determined for use by lay rescuers (non-professionals)
- The device analyses heart rhythm and gives clear commands (instructions) to follow
- The use is simple and safe
- To be found at the airports, trade centres, sport stadiums...)

AED

- As soon as the AED arrives, turn it on
- Follow the spoken and visual guidance given by the AED
- Attach the electrode pads on the victim's bare chest (sometimes it is necessary to insert also the pads into the AED)
- If more than one rescuer is present, chest compressions shall be continued while electrodes are being attached to the chest!!!!
- As soon as electrodes are attached, nobody must touch the patient
- If the shock is advised, immediately (after we check that noone is touching the victim), push the shock button. After the shock, continue with CPR at once.
- If no shock is advised, immediately continue with chest compressions as guided by AED
- After 2 minutes the AED tells us to stop CPR and analyses the rhythm again

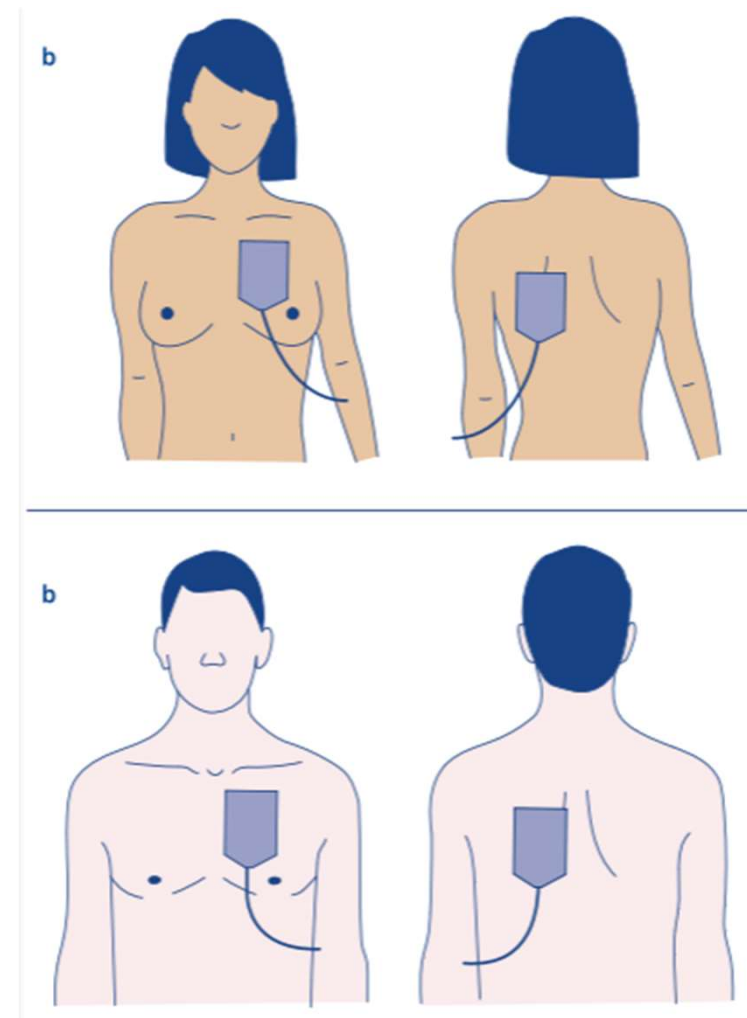
AED – position of electrodes

- Preferenčně medioklavikulární čára vpravo a střední axilární čára vlevo
- Nutné vyhnout se bradavce



AED – position of electrodes

- Anterior-posterior position alternatively



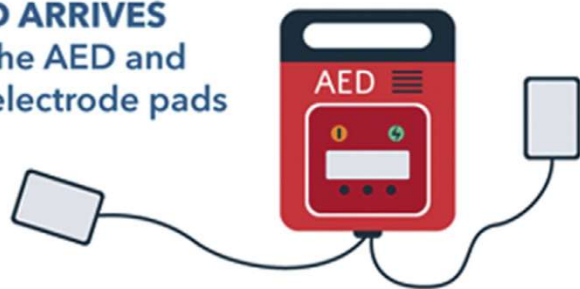
AED



AED

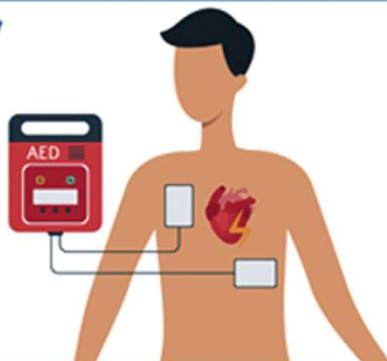


WHEN AED ARRIVES
Switch on the AED and
attach the electrode pads



- As soon as the AED arrives switch it on and attach the electrode pads to the victim's bare chest
- If more than one rescuer is present, CPR should be continued whilst the electrode pads are being attached to the chest

**FOLLOW THE SPOKEN/
VISUAL DIRECTIONS**



- Follow the spoken and visual directions given by the AED
- **If a shock is advised**, ensure that neither you nor anyone else is touching the victim
- Push the shock button as directed
- Then **immediately** resume CPR and continue as directed by the AED

IF NO SHOCK IS ADVISED

Continue CPR



- If no shock is advised, immediately resume CPR and continue as directed by the AED

IF NO AED IS AVAILABLE

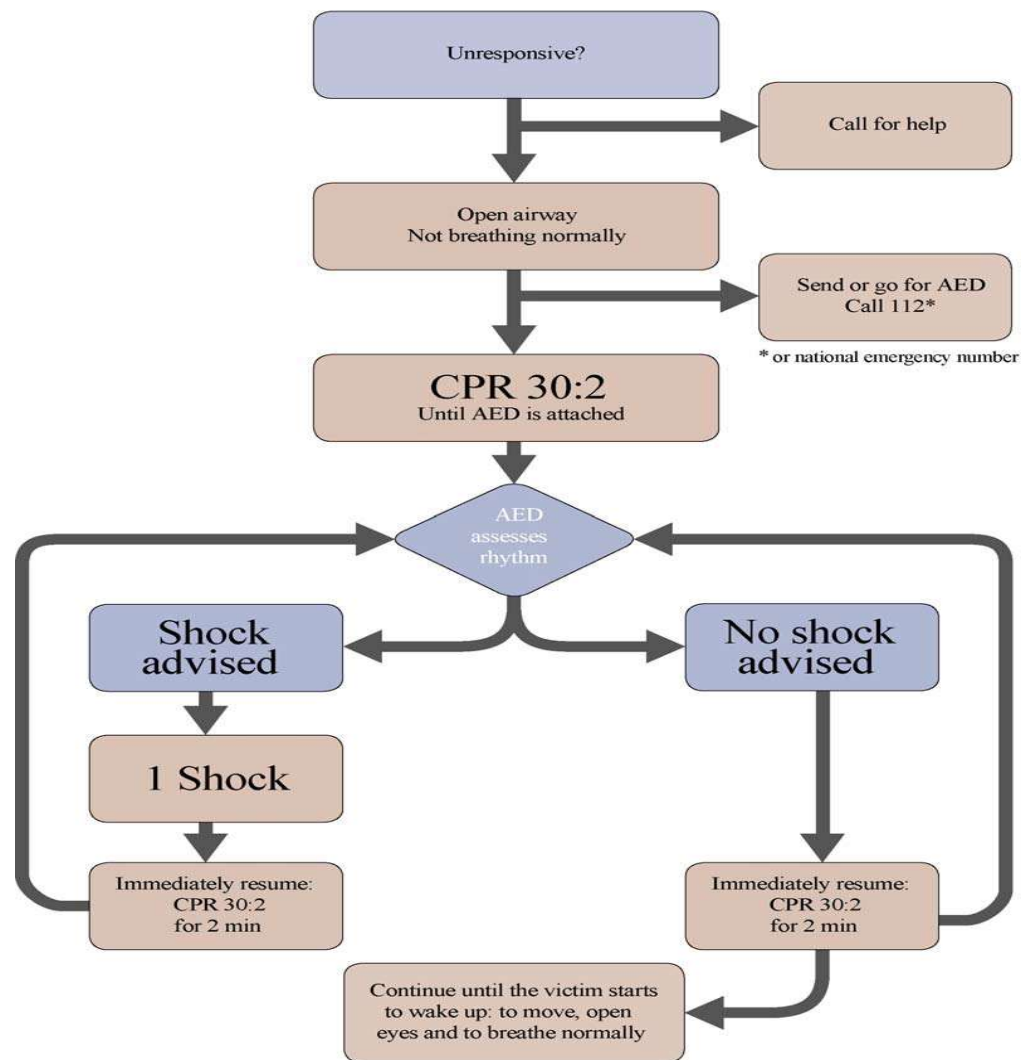
Continue CPR



- If no AED is available, **OR** whilst waiting for one to arrive, continue CPR
- Do not interrupt resuscitation until:
 - A health professional tells you to stop OR
 - The victim is definitely waking up, moving, opening eyes, and breathing normally
 - OR
 - You become exhausted
- It is rare for CPR alone to restart the heart. Unless you are certain that the victim has recovered continue CPR
- Signs that the victim has recovered
 - Waking-up
 - Moving
 - Opening eyes
 - Breathing normally



Automated External Defibrillation Algorithm



AED



BLK

Fig. 8k - Send for AED.



Fig. 8l - When AED arrives, continue chest compressions, while placing defibrillation pads.

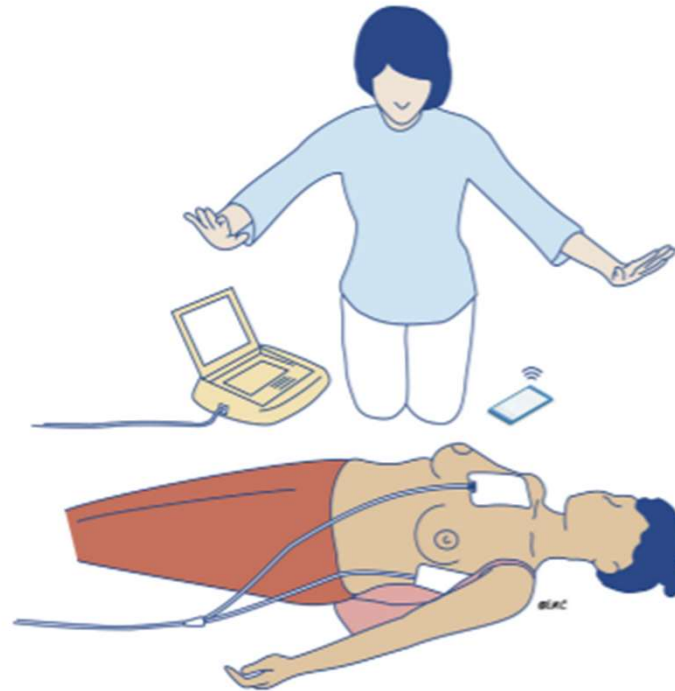


Fig. 8m - Follow the directions of the AED.

AED



Fig. 8o - If a shock is not indicated, continue chest compressions.



Fig. 8n - If shock is indicated, deliver shock and continue chest compressions.

Do not start resuscitation

- Definite signs of death (rigor mortis, mortal stains...)
- Injury incompatible with life
- Living will (DNR)
- Unfavourable prognosis despite maximal therapy (decision of medical team)



Finish resuscitation

- Presence of signs of life
 - Coughing
 - Movements, fighting, breathing, eye opening
- Handover by RMS
- Exhausted rescuer



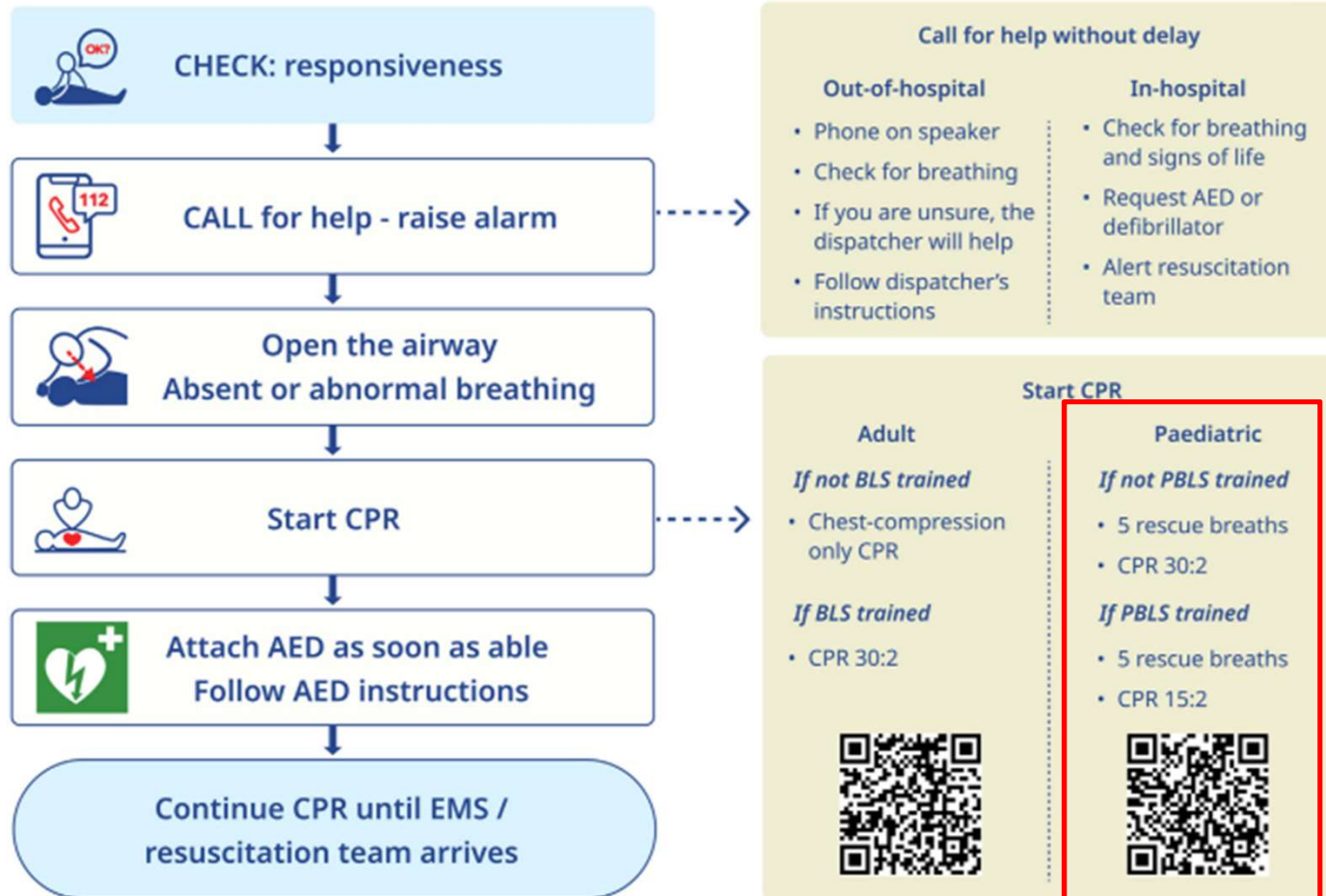


Basic differences in children

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Differences in children

- Nearly all cardiac arrests in children are caused by suffocation (failure of breathing)
- If lone rescuer, start resuscitation with 5 initial rescue breaths (individualized breath volume)
- Continue resuscitation in 15:2 ratio for a period of 1 minute, afterwards call 112
- Continue resuscitation 15:2
- For lay persons it is acceptable to follow BLS guidelines for adults (30:2) – you are not lay persons, so forget



Differences in children

- Chest compressions
- Depth 1/3 of AP chest diameter
 - Both hands technique
 - School children
 - Single hand technique
 - Children up to 8 years
 - 2 fingers or thumbs technique
 - Infants
 - Technique with two thumbs is preferable



Paediatric Life Support
chest compressions.



QR code 5. One-hand or two-hand technique in
children.



Chest compressions

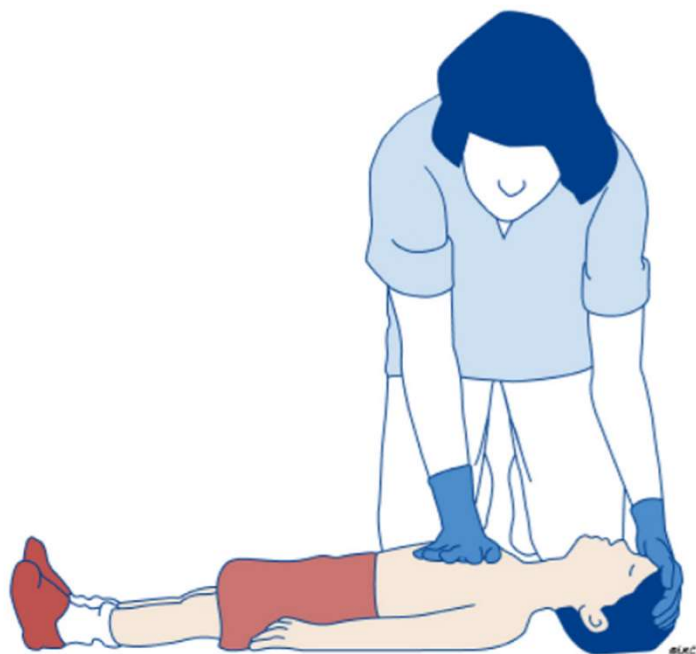


Fig. 12 - Chest compressions in a child - one-hand



Fig. 11 - Chest compressions in an infant - two-thumb encircling technique.

Ventilation in children and infants

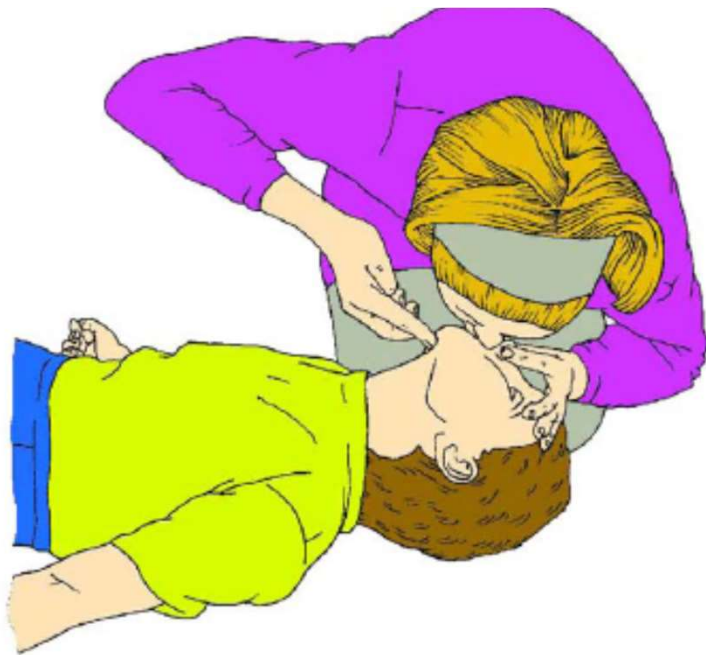


Figure 6.2 Mouth-to-mouth ventilation— child. © 2005 ERC.

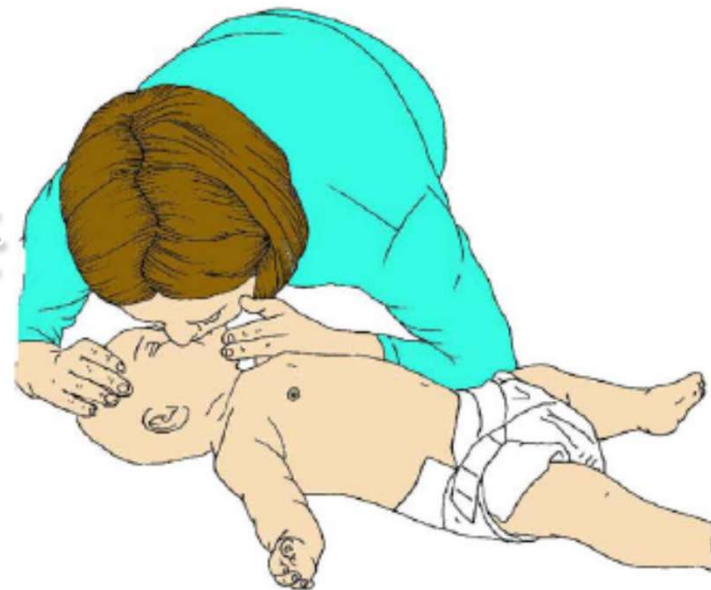


Figure 6.3 Mouth-to-mouth and nose ventilation— infant. © 2005 ERC.

Ventilation in children



Fig. 7 – Opening airway in an infant – neutral position.



Fig. 9 – Rescue breathing in an infant – mouth-to-mouth-and-nose technique.



Fig. 8 – Opening airway in a child – 'sniffing position'.

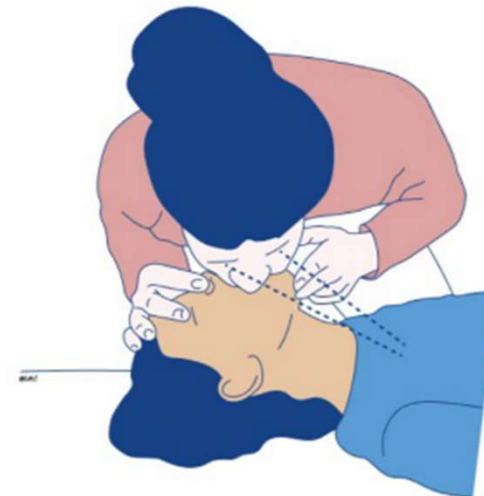


Fig. 10 – Rescue breathing in a child – mouth-to-mouth technique.

Ventilace u dětí



QR code 1.
Paediatric Life Support
– open airway.



Paediatric Life Support
rescue breaths.

AED

- In children between 1-8 years of age the use of special children electrodes is advised if those are available
- If those electrodes are not available, use standard electrodes
- AED was also successfully used in children younger than 1 year

AED

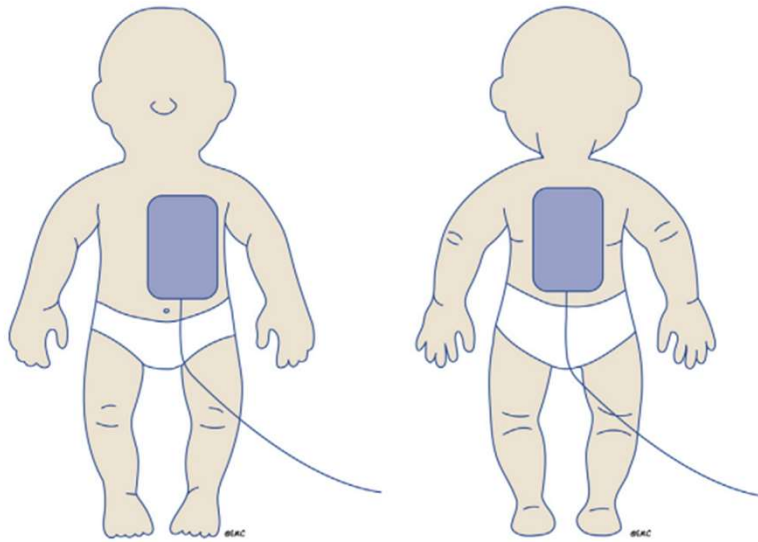


Fig. 14 – Antero-posterior position of the defibrillation pads in children up to 25 kg.

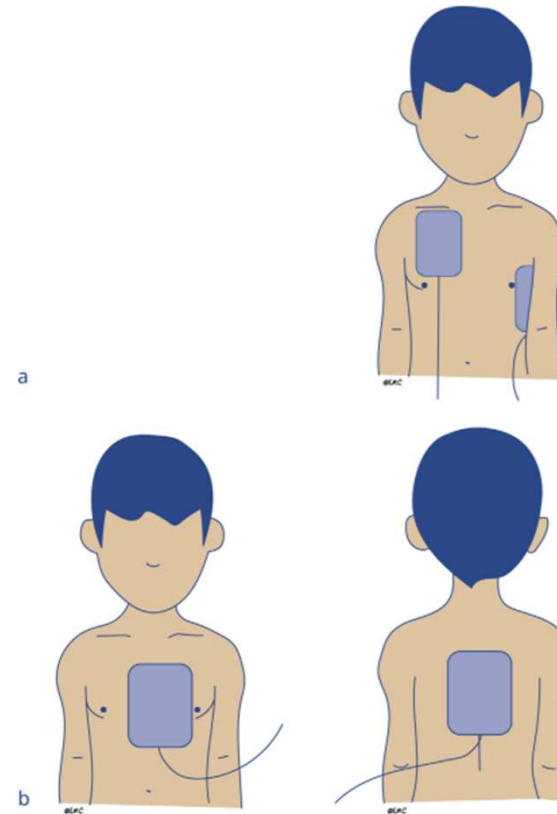


Fig. 15 – Antero-lateral (a) or antero-posterior position (b) of the defibrillation pads in children more than 25 kg.



Foreign Body Aspiration

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Foreign Body Aspiration



- Life threatening condition, untreated, leading to death within several minutes
- In adults frequent aspiration of food
 - Usually drunken eating
- In children usually aspiration of toys, food, small things...



Foreign Body Aspiration



- Assessment of severity of airway obstruction

Table 2.1

Differentiation between mild and severe foreign body airway obstruction (FBAO).^a

Sign	Mild obstruction	Severe obstruction
“Are you choking?”	“Yes”	Unable to speak, may nod
Other signs	Can speak, cough, breathe	Cannot breathe/wheezy breathing/silent attempts to cough/unconsciousness

^a General signs of FBAO: attack occurs while eating; victim may clutch his neck.



Foreign Body Aspiration

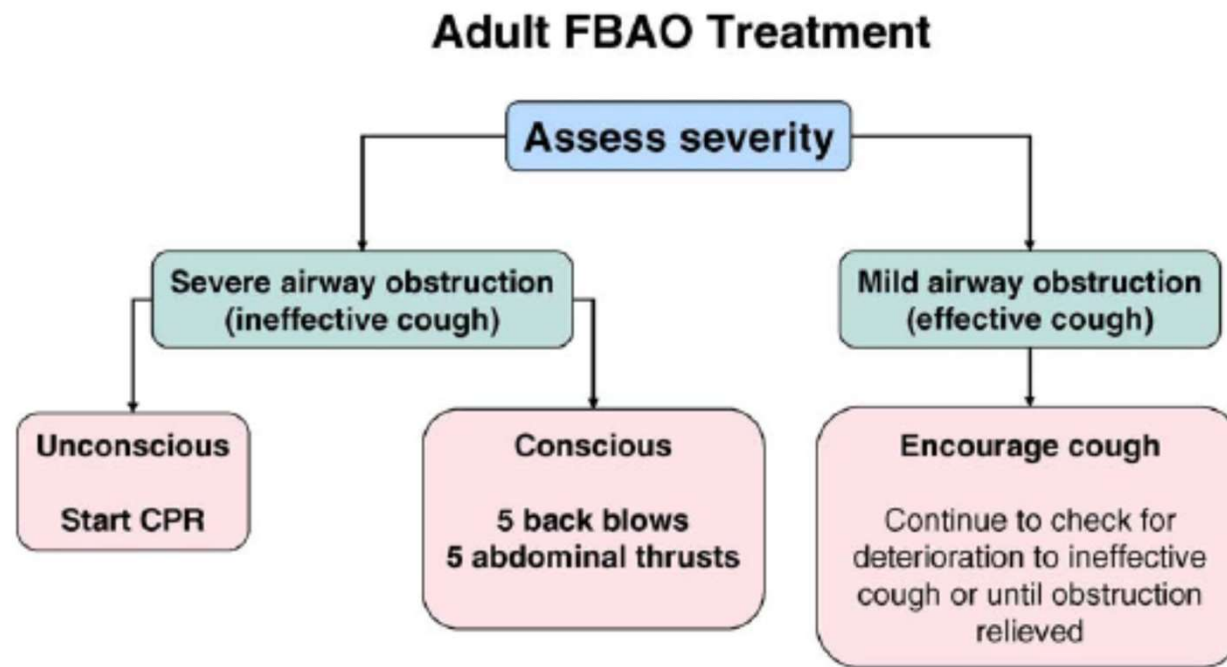


Figure 2.19 Adult foreign body airway obstruction treatment algorithm.



Heimlich maneuver

- Abdominal thrusts
- Not recommended in infants and small children
 - Risk of abdominal organs injury
- Not recommended in obese persons
 - Minimal effect
- Inadmissible in pregnant women
 - Risk of injury of fetus or placenta
 - Back slapping or chest thrusts



Foreign Body Aspiration in children

Paediatric Foreign Body Airway Obstruction Treatment

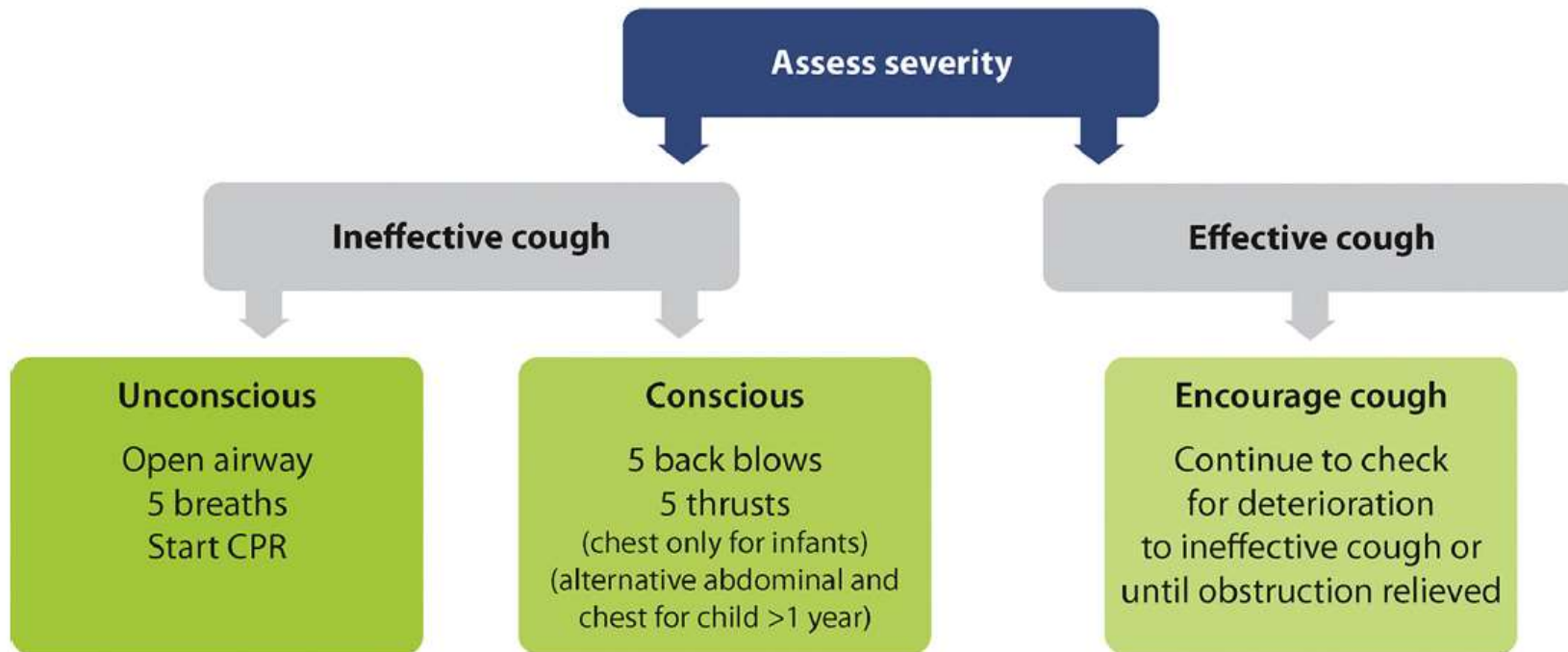


Fig. 6.7. Paediatric foreign body airway obstruction algorithm.

QR Codes



- BLS in adults

QR Codes



- BLS in children



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Questions?



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Thanks for your attention

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