Cardiopulmonary Resuscitation (CPR)

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Why is it important to learn?

- Each 10% improvement in adherence to standards results in a ˜30% increase in return of spontaneous circulation (ROSC).
- Cardiopulmonary resuscitation circulates blood that contains oxygen to the vital organs of a patient in cardiac arrest when the heart and breathing have stopped.
  - It includes chest compressions and
  - ventilations as well as
  - the use of an automated external defibrillator (AED).
- It saves lives literally and can be quite successful if done right, on time and early

What is Basic Life Support?

- Basic Life Support (BLS) refers to the **care healthcare providers and public safety professionals provide to patients who are experiencing respiratory arrest, cardiac arrest or airway obstruction**.
- BLS includes psychomotor skills for performing high-quality cardiopulmonary resuscitation (CPR), using an automated external defibrillator (AED) and relieving an obstructed airway for patients of all ages

When is CPR typically Needed In-Hospital?

1. **RESPIRATORY ARREST**
   - If the patient is not breathing but has a definitive pulse, the patient is in respiratory arrest.
   - To care for a patient experiencing respiratory arrest, ventilations must be given.
2. **CARDIAC ARREST**
   - If there is no breathing, no pulse and the patient is unresponsive, the patient is in **cardiac arrest**.
   - Cardiac arrest is a life-threatening situation in which the electrical and/or mechanical system of the heart malfunctions resulting in complete cessation of the heart's ability to function and circulate blood efficiently

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How to Institute Basic Life Support (BLS)

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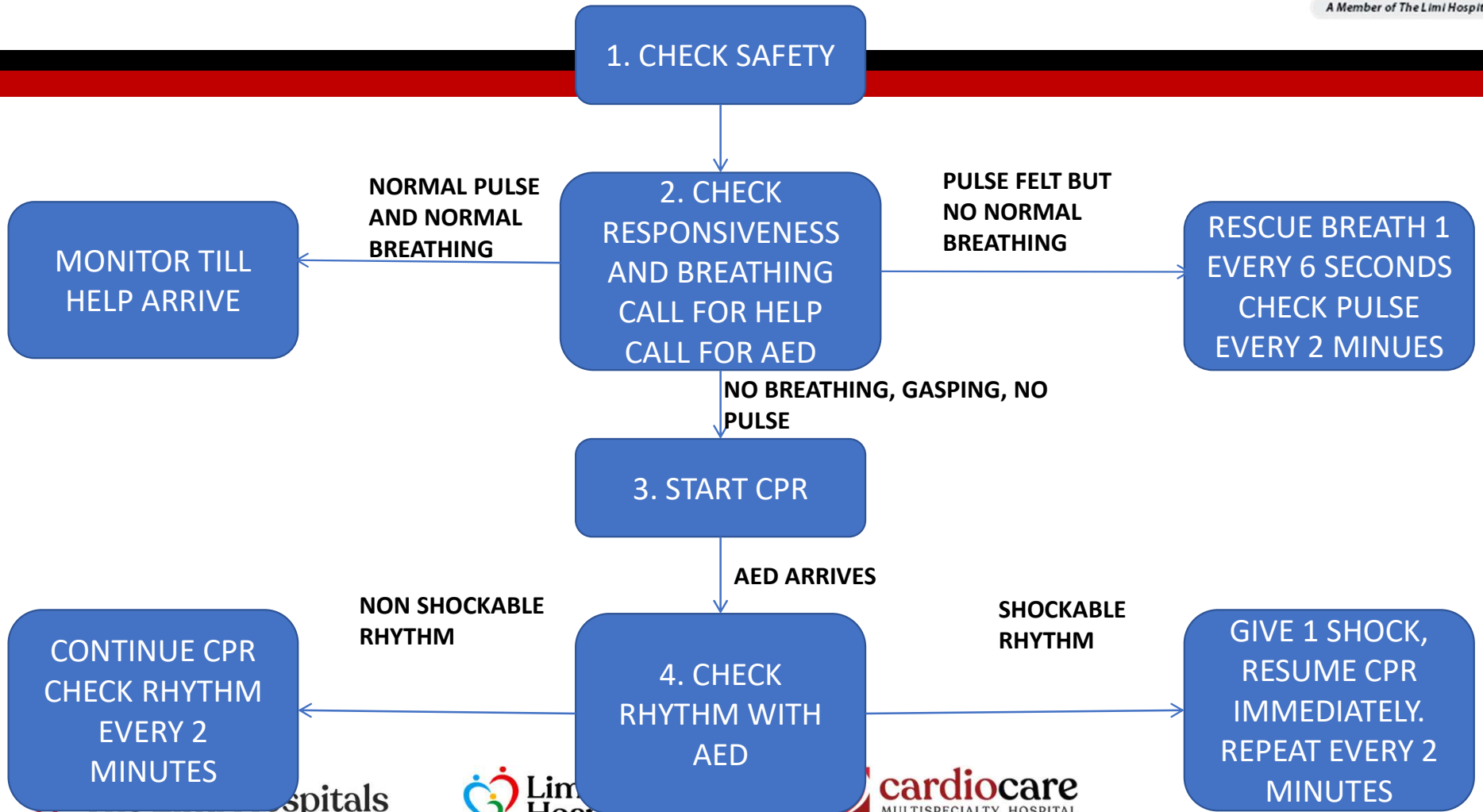
Chain of survival: Adult

Adult IHCA Chain of Survival

Adult OHCA Chain of Survival

Chain of Survival: Paediatric

CARDIOCARE BLS ALGORITHM- 4C



Prevention

- Identify patients at risk in-hospital
- Institute appropriate level of therapy/response
- Close monitoring of those at risk
- Treat underlying critical conditions appropriately and in a timely fashion
- Ensure that AED and other resuscitation materials are always ready

1. Safety first

- Check for safety of the environment for you and the patient
- Move from position of danger, pool of water
- May need relatives to be away

2. Check for responsiveness and call for help

- Check for Responsiveness
  a. Tap shoulder vigorously
  b. Call out patients name

2. Call For Help

- Don’t leave the Patient/Guest(outside- go look for help)
- Call for help/Activate Emergency Medical System/Call a Code
  - More people to assist
  - Senior people to assist
  - AED to be retrieved immediately
- Commence CPR while waiting for help

2. Call For Help (2)

- HELP Means:
  - AED
  - Doctor and/or Consultant (Code Blue Team if available)
  - Emergency ACLS-ready trolley close to scene
  - Invite Anesthesiologists and others to commence ACLS

3. Initial Assessment (1)

c. Assess breathing
   - Check for movement of chest wall

3. Initial Assessment (2)

d. Assess pulse

- Check carotid pulse on the side of the neck
- Locate the trachea on the side closest to you
- Slide two fingers into the groove between the tracheal and the muscles at the side of the neck

3. Initial Assessment (3)

- Assess Responsiveness, Breathing and Pulse simultaneously in **5 secs but not more than 10 secs**

1. **Respiratory arrest**: If the guest is not breathing but has a definitive pulse.- ventilate only with “Rescue breaths”
2. **Cardiac arrest:** If there is no breathing, no pulse and the guest is unresponsive.
3. ***GASPING (agonal breathing)*** *should be regarded the same as not-breathing*

4. START CPR

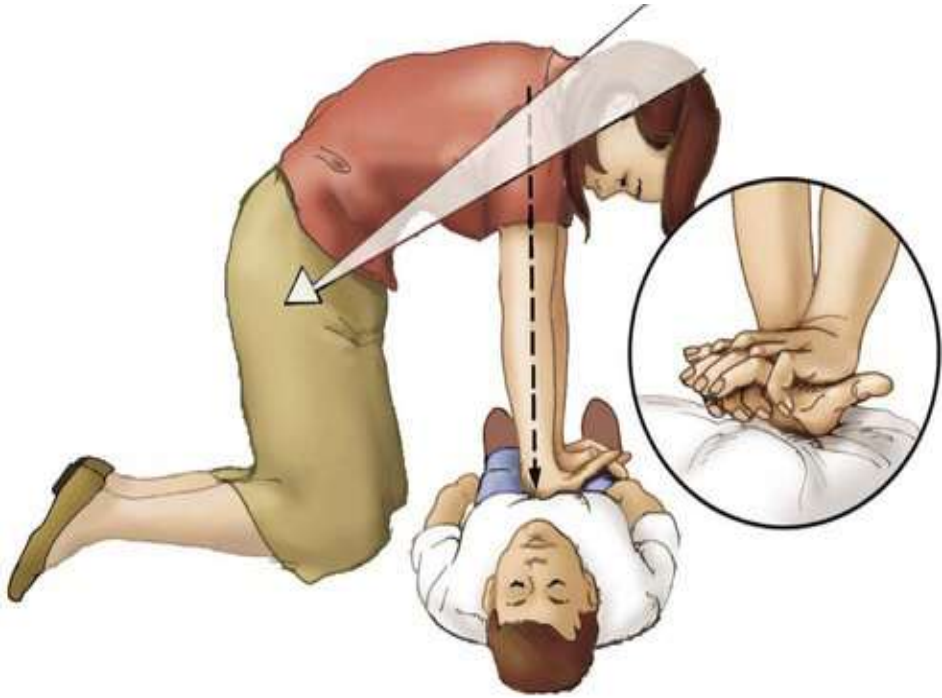
- The vast majority of cardiac arrests occur in adults, and the highest survival rates from cardiac arrest are reported among patients of all ages who have a witnessed arrest and an initial rhythm of VF or pulseless VT.
- In these patients, the critical initial elements of BLS are chest compressions and early defibrillation.
- High quality CPR with minimal interruptions and early defibrillation are the actions most closely related to good resuscitation outcomes

Cardiopulmonary Resuscitation (CPR)

- Cardiopulmonary resuscitation circulates blood that contains oxygen to the vital organs of a patient in cardiac arrest when the heart and breathing have stopped.
- It includes:
  - Chest compressions
  - Ventilations
  - Automated External Defibrillator (AED) Use

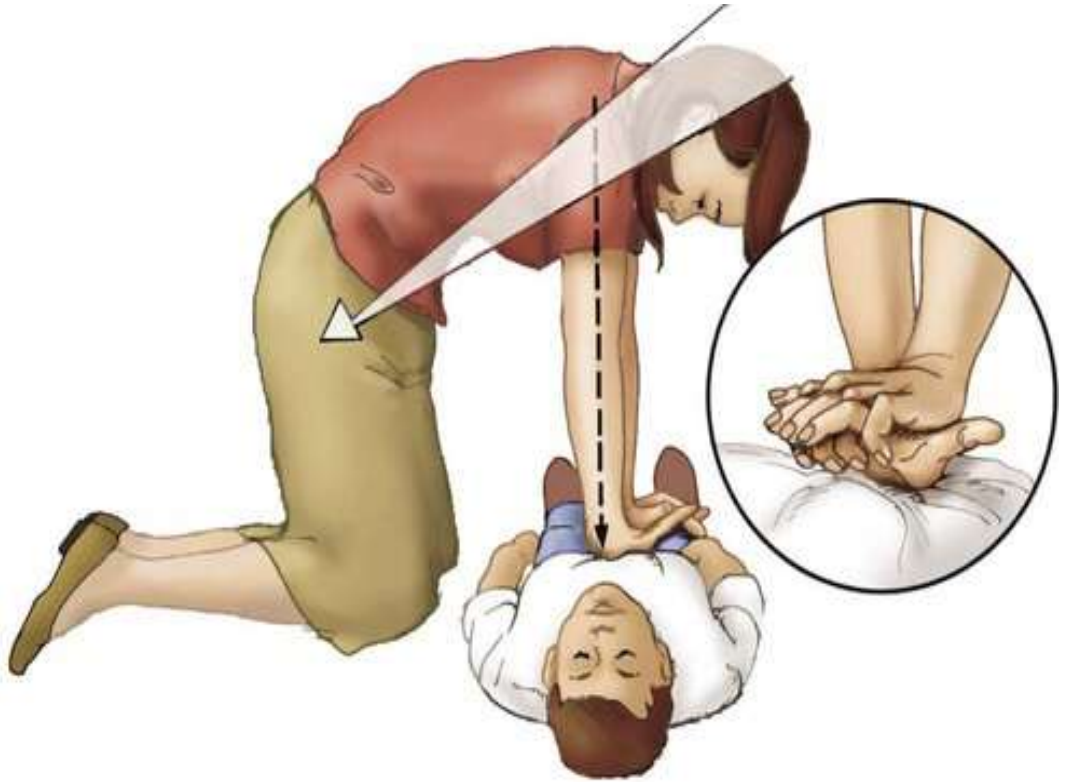
4. Chest Compressions (1)

- Place patient on a firm surface
  - Backboard
  - Deflation of air mattress
- Hand in the middle of the chest
- Arms straight as possible, lock elbows
  - 5 cm (2”) of depression
  - Allow complete recoil- Allow as much time relaxing as compressing

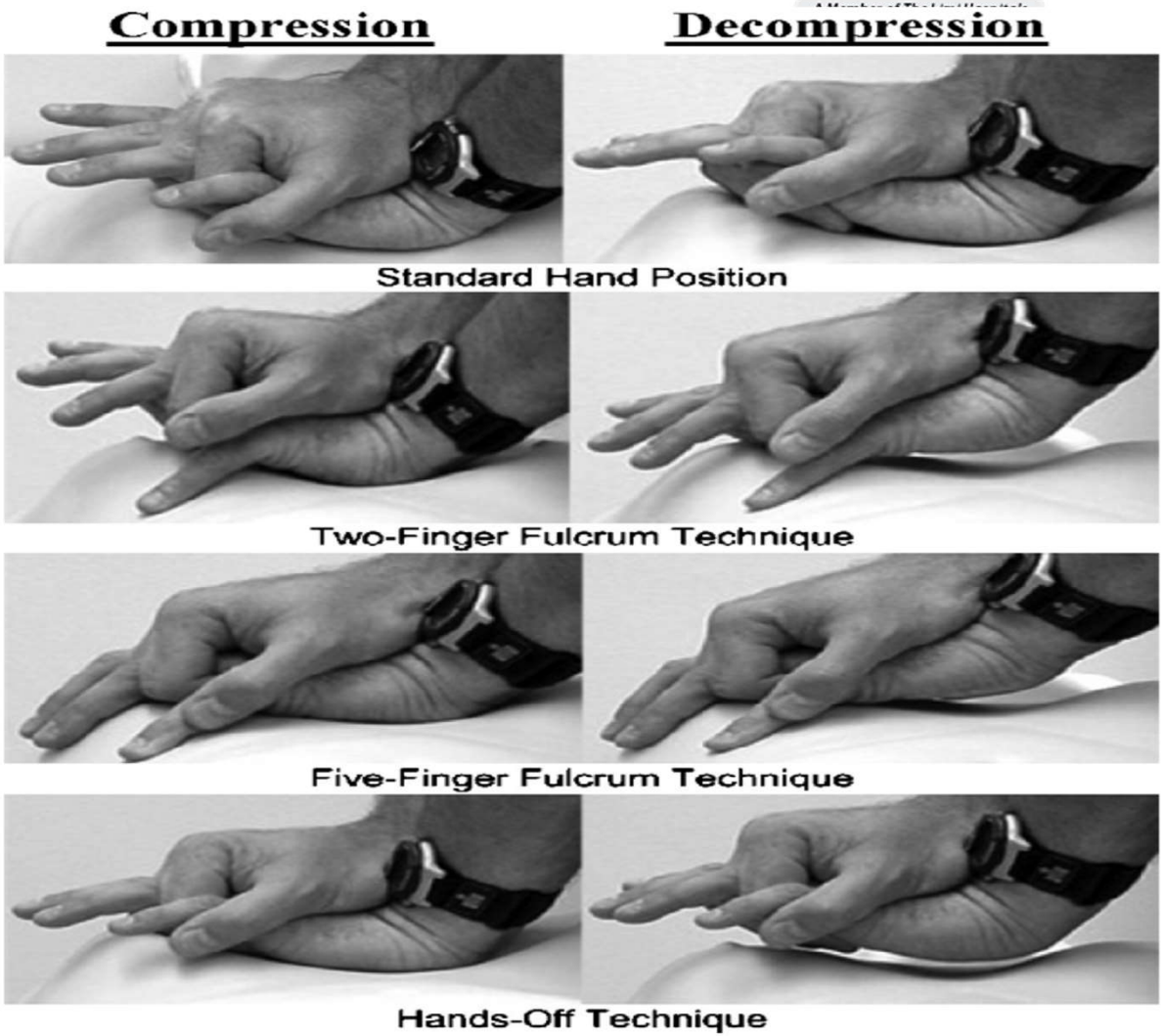


4. Chest Compressions (2)

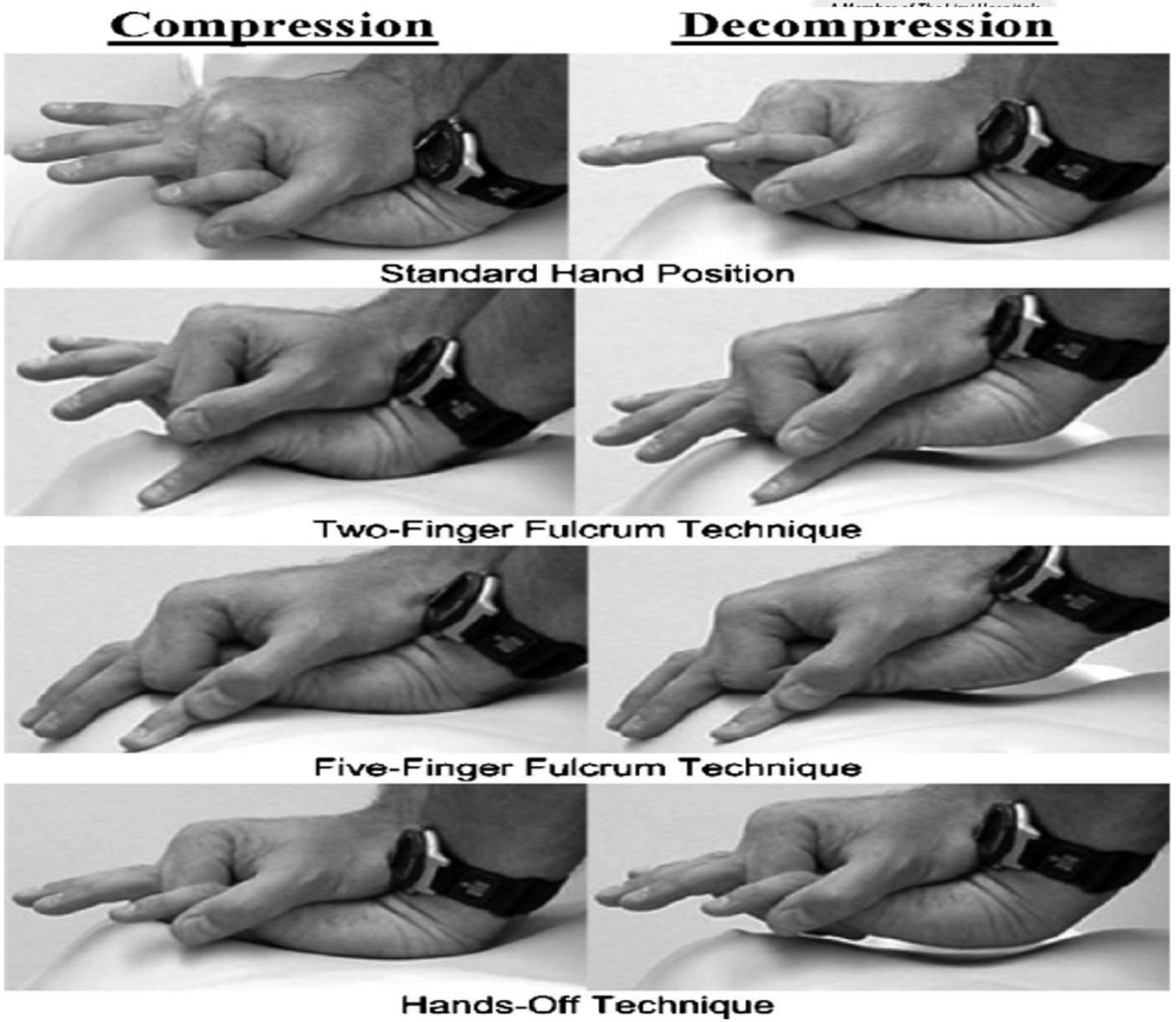
- Rate 100-120 cpm
- For adult patients, CPR consists of 30 chest compressions followed by 2 ventilations.
  (Children same except if two rescuers then 15:2)
  - Count out loud so other members of the team can follow



- to promote effective compressions
- Arms are as straight as possible, with
- the shoulders directly over the hands



- Locking elbows will help maintain straight arms.
- Minimize interruption in CPR



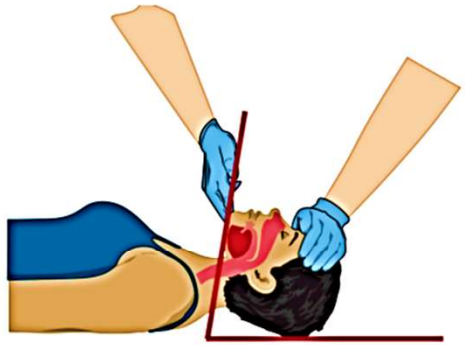
CHARACTERISTICS OF GOOD COMPRESSION

- “Push hard push fast”. Push at a rate of 100-120 min.
- Compression depth- at least 2 inches(5cm) not more than 2.5 inches
- Release completely to allow the chest to fully recoil.
- A compression-ventilation ratio of 30:2 .
- Do not bounce your hands up and down on the victim's chest.
- Never use the palm of your hand, use the heel of your hand

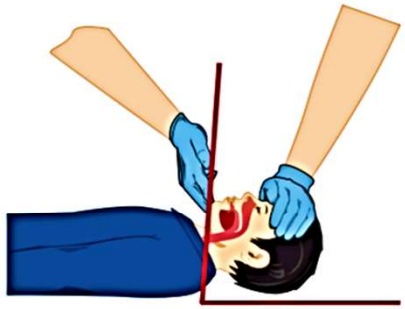
- Ventilations supply oxygen to a patient who is not breathing.
- They may be given via several methods including:
  - Mouth-to-mouth.
  - Pocket mask.
  - Bag-valve-mask (BVM) resuscitator (Ambu-bag)
- During adult CPR, you give 2 ventilations that last approximately 1 second each and make the chest rise.

5. Ventilations: Airway

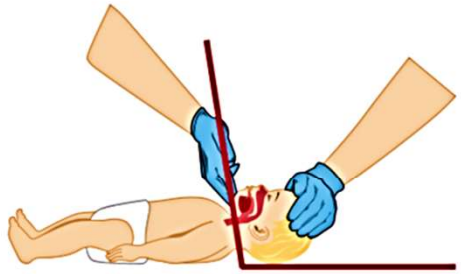
- Head-tilt/chin-lift **slightly past a neutral position**



Past neutral position



Slightly past neutral position

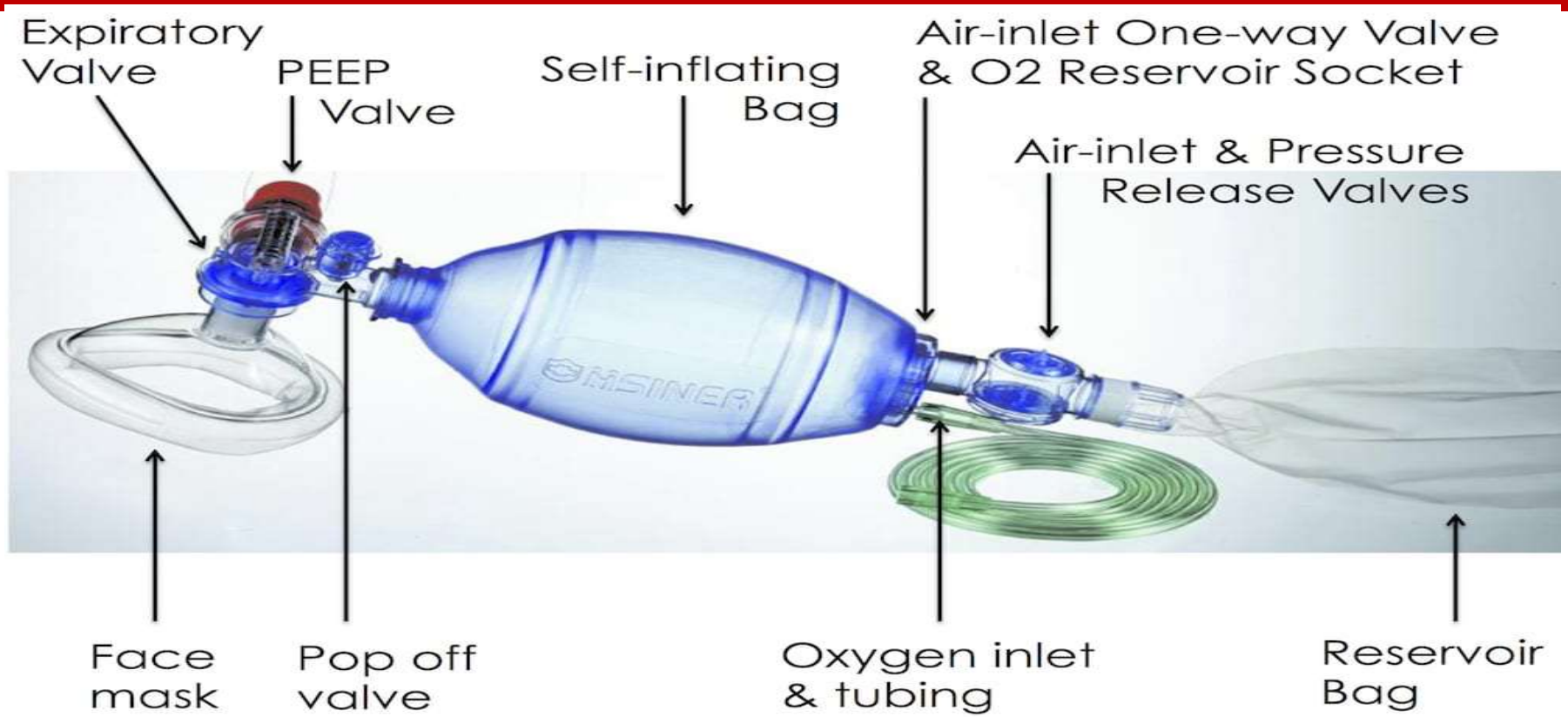


Neutral position

5. Ventilations: Airway

- Clear Airway
- Head-tilt/chin-lift slightly past a neutral position
- 1 second in duration for each ventilation
- Delivered- **Watch for visible chest rise**
- once every 6 seconds (once every 3 seconds in children) in Respiratory Arrest or
- Delivered twice every 30 compressions in Cardiac Arrest (30:2)- both adult and children

5. Ventilations: Airway



5. Ventilations: Airway

- When giving ventilations, if the chest does not rise after the first breath:
  - Reopen the airway
  - Check for visible obstruction and remove if seen
  - NEVER **perform a blind finger sweep**
  - You may recommence compressions while rechecking the airways
- Open the airway past neutral position while positioned at the top of the patient's head (cephalic position).

5. Ventilations: Bag-Valve-Mask Resuscitator (Ambu)

- Use an E-C hand position (first rescuer):
  - Place hand around the mask, forming a C with the thumb and index finger around both sides of the mask. And other three fingers under mandible in form of an E
  - Seal the mask completely around the patient's mouth and nose by lifting the jaw into the mask while maintaining an open airway.

5. Ventilations: Bag-Valve-Mask Resuscitator (Ambu)- 2

- Provide ventilations (second rescuer): -
  - Depress the bag about halfway to deliver between 400 to 700 mls of volume to make the chest rise.
  - Give smooth and effortless ventilations that last about 1 second.
- NEVER completely deflate Ambu Bag- it can hold up to 1000mls

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5. Ventilations: Bag-Valve-Mask Resuscitation

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6. Automated External Defibrillators (AED)

- Portable electronic devices that
  - automatically analyze the patient's heart rhythm and
  - can provide defibrillation- an electrical shock that may help the heart re-establish a perfusing rhythm.
- An AED should be applied as soon as one is readily available.

6. Automated External Defibrillators (AED)

- AEDs deliver defibrillation(s) to patients in cardiac arrest with two specific dysrhythmias:
  - ventricular fibrillation (V-fib) and
  - ventricular tachycardia (V-tach).
- By using an AED early, the patient's chances of survival are greatly increased.
- **For each minute CPR and defibrillation are delayed, a patient's chance for survival is reduced by 7 to 10 percent.**

- 3 steps
  1. Apply pads and connect to AED
  2. Turn it on
  3. Follow the commands
- Continue CPR while attaching the AED
- Don’t touch the patient when it’s analyzing or about to shock the patient.

Using an AED Effectively - 1

- Turn it on first.
- Make sure the patient's chest is clearly exposed and dry.
- Remove any medication patches with a gloved hand.
- If necessary, remove or cut any undergarments that may be in the way.
- The pads need to be adhered to the skin for the shock to be delivered to the heart

Using an AED Effectively - 2

- Apply the appropriate-sized pads for the patient's age in the proper location on the bare chest. –
- Use adult pads for adults and children over the age of 8 years or over 55 pounds.
- Place one pad on the upper right chest below the right clavicle to the right of the sternum
- Place the other pad on the left side of the chest on the mid-axillary line a few inches below the left armpit.
- Plug in the connector, and push the analyze button, if necessary.

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Using an AED Effectively - 3

- Tell everyone to “clear” while the AED is analyzing to ensure accurate analysis.
- Ensure no one is touching the patient during the analysis or shock.
- When “clear” is announced, have the rescuer performing the compressions stop compressions and hover a few inches above the chest, but remain in position to resume compressions immediately after a shock is delivered or the AED advises that a shock is not indicated.
- Observe the AED analysis and prepare for a shock to be delivered if advised.
- Ensure that everyone is clear of the patient before the shock is delivered.

Using an AED Effectively - 3

- Ensure that everyone is clear of the patient before the shock is delivered.

Using an AED Effectively - 4

- Deliver the shock by pressing the shock button, if indicated.
- After the shock is delivered, immediately start compressions and perform about 2 minutes of CPR (about 5 cycles of 30:2) until the AED prompts that it is reanalyzing, the patient shows signs of return of spontaneous circulation (ROSC), or you are instructed by the team leader or more advanced personnel to stop.
- Do not wait for the AED to prompt to begin CPR after a shock or no shock advised message.

Do's for AED USE

- Before shocking a patient with an AED, do make sure that no one is touching or is in contact with the patient or any resuscitation equipment.
- Do use an AED if a patient is experiencing cardiac arrest as a result of traumatic injuries.
- Follow local protocols or practice.
- Do use an AED for a patient who is pregnant.
  - Defibrillation shocks transfer no significant electrical current to the fetus. The mother's survival is paramount to the infant's survival. Follow local protocols and medical direction.

Don’ts for AED USE

- Do not use alcohol/spirit to wipe the patient’s chest dry. Alcohol is flammable.
- Do not touch the patient while the AED is analyzing. Touching or moving the patient may affect analysis.
- Do not touch the patient while the device is defibrillating. You or someone else could be shocked.
- Do not defibrillate someone when around flammable or combustible materials, such as gasoline or free-flowing oxygen.

What to do if?

- In the absence of pediatric pads or a pediatric setting on the AED, you may use adult pads for the child.
  - But be sure that the pads do not touch each other
- Respiratory Arrest: Give only rescue breaths 1 every 5-6secs
- Patient has an advanced airway: Rescue breaths as above and continuos compression

Stopping CPR

- Once started, continue CPR with 30 compressions followed by 2 ventilations (1 cycle = 30:2) until:
  1. Signs of return of spontaneous circulation (ROSC) such as patient movement or breathing.
  2. An AED is ready to analyze the patient's heart rhythm.
  3. Other trained rescuers take over and relieve you from compression or ventilation responsibilities.
  4. You are presented with a valid do not resuscitate (DNR) order.
  5. You are alone and too exhausted to continue.
  6. The scene becomes unsafe.


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Demonstration & Exam

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