

# CARDIOPULMONARY RESUSCITATION (CPR)



# INTRODUCTION

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Cardio pulmonary Resuscitation (CPR) is a technique of basic life support for oxygenation the brain and heart until appropriate, definitive medical treatment can restore normal heart and ventilator action.



# Learning agenda

- Definition
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- Purposes of CPR
  - Indications
  - General instructions
  - Pericardial thump
  - Site for cardiac compression
  - Preparation of the patient and the environment



# Learning agenda

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- Procedure
  - A)infants(1-12 months)
  - B)children (1-7yrs)
- Phases
  - BLS , ALS (Equipment, Drugs), PLS
- Signs of effective & ineffective resuscitation
- Summary
- References



# DEFINITION

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- “Resuscitation is a method which includes all measures that are applied to revive patients who have stopped breathing suddenly and unexpectedly due to either respiratory or cardiac failure.”



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“Cardio pulmonary resuscitation is a technique of basic life support for oxygenating the brain and heart until appropriate definitive medical treatment can restore normal heart and ventilatory action.”



# PURPOSES OF CPR

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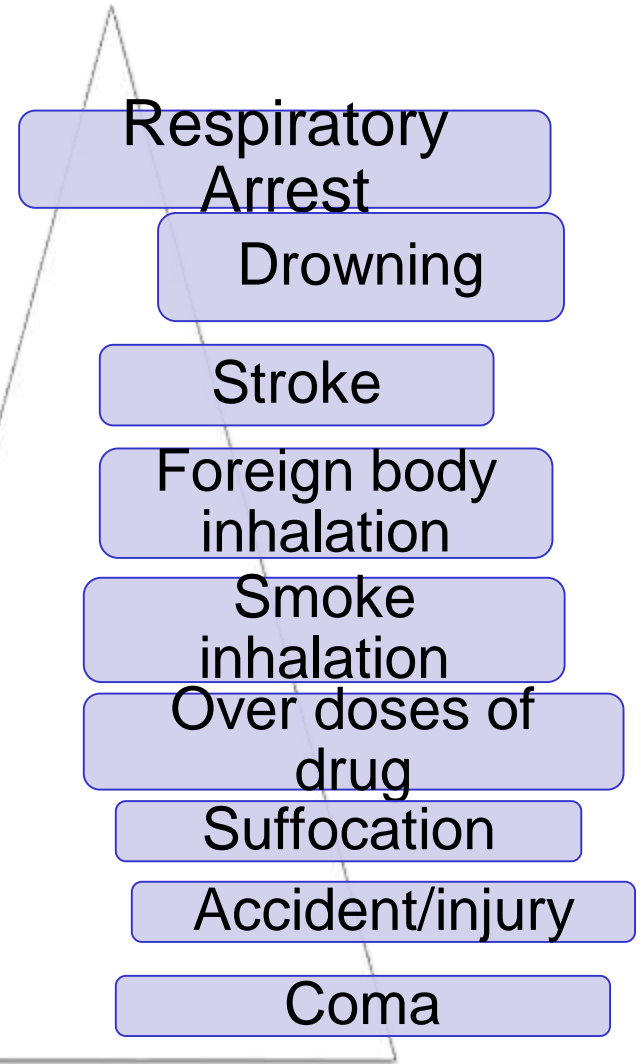
- To maintain an open and clear airway**(A)**
- To maintain breathing by artificial ventilation**(B)**
- To maintain blood circulation by external cardiac massage **(C)**
- To save the life of the patient
- To provide basic life support till the medical and advanced life support arrives.
- To restore effective circulation and ventilation
- To prevent irreversible cerebral damage due to anoxia.



# Indications

- Ventricular fibrillation(VF)
- Ventricular tachycardia(VT)
- Asystole
- Pulseless electrical activity

**Cardiac arrest**





# General instructions



CPR techniques are used in persons whose respirations and circulation have suddenly and unexpectedly stopped.



CPR techniques is exempted in patients with last stage of an incurable illness, whose heart beat and respirations have been absent for more than 6 minutes.





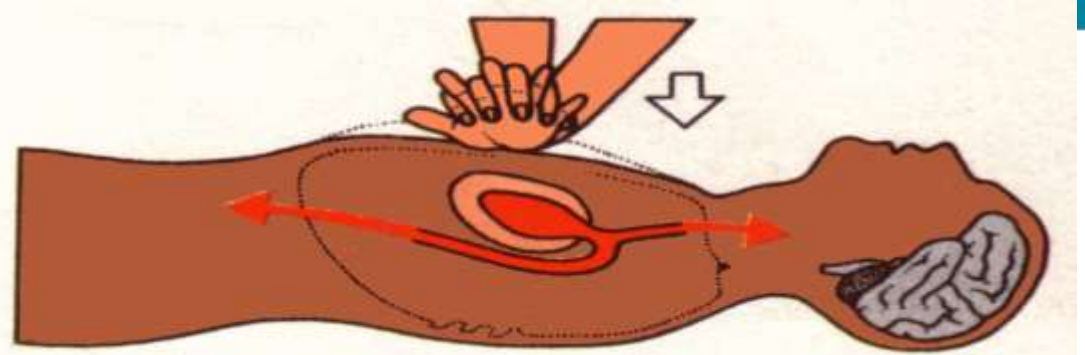
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- The immediate responsibilities of the resuscitator are:
    1. To recognize the signs of cardiac arrest .
    2. Protect the patients brain from anoxia by artificial ventilation and external cardiac massage
    3. Call for the help.





- The cardio pulmonary resuscitation should be initiated within 3-4 minutes in order to prevent permanent brain damage
  1. Strike the centre of the chest sharply with the side of the clenched fist twice.
  2. Call for the assistance .
  3. Clear the airway of false teeth,vomitus food material etc.
  4. Initiate ventilation and external cardiac massage without wasting the time.





- The CPR techniques should not be discontinued for more than 5 seconds before normal circulation and ventilation of lungs are established except:
  1. When the patient is moved to a hard surface
  2. When the endotracheal intubation is being carried out.
- Before CPR is attempted in a patient, make sure that the airway is clear, so keep the patient's neck hyper extended after confirming that he is having any cervical injury.



# Precordial Thump



# PRECORDIAL THUMP

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- Use of “precordial thump” is effective in case of witnessed **cardiac arrest, pulseless ventricular tachycardia.**
- It is a blow to the ***lower half of the patient’s sternum*** with the fleshy part of the fist from ***8-12 inches*** above the patient’s chest.
- The blow generates a *small current of electricity* , which shocks the myocardium and ***stimulates cardiac beating and circulation.***



- To be effective it must be done within a minute of cardiac arrest.
- If delayed it may precipitate *ventricular fibrillations*.
- *Cardiac compression help to stimulate the circulation.*
- LOCATION:*Lower half of the sternum*

**NOTE:**

- a. If hands are placed too far to the right –*ribs may be fractured.*
- b. If hands are placed too high-*collar bone may be fractured.*
- c. If hands are placed too low –*liver may be damaged*

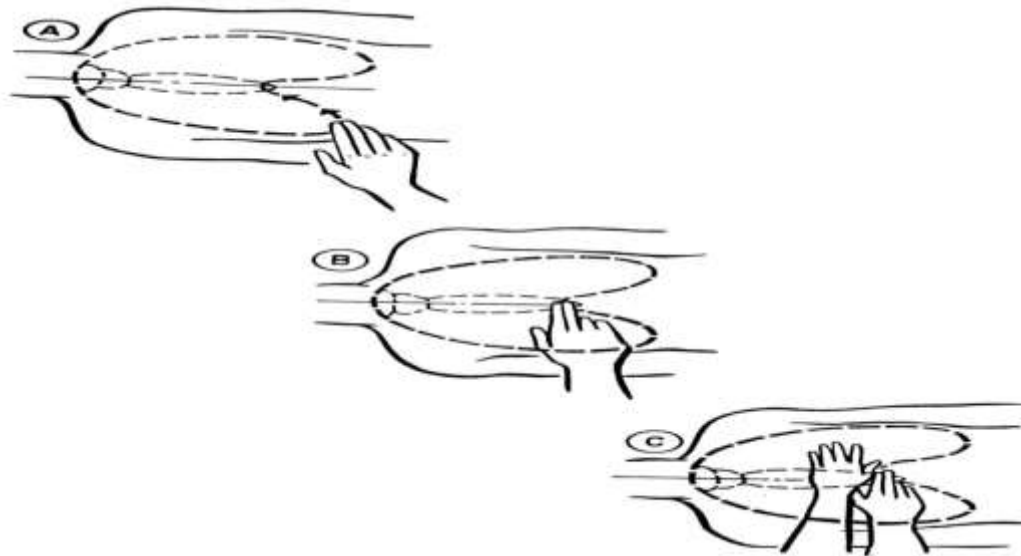




# SITE FOR CARDIAC COMPRESSION



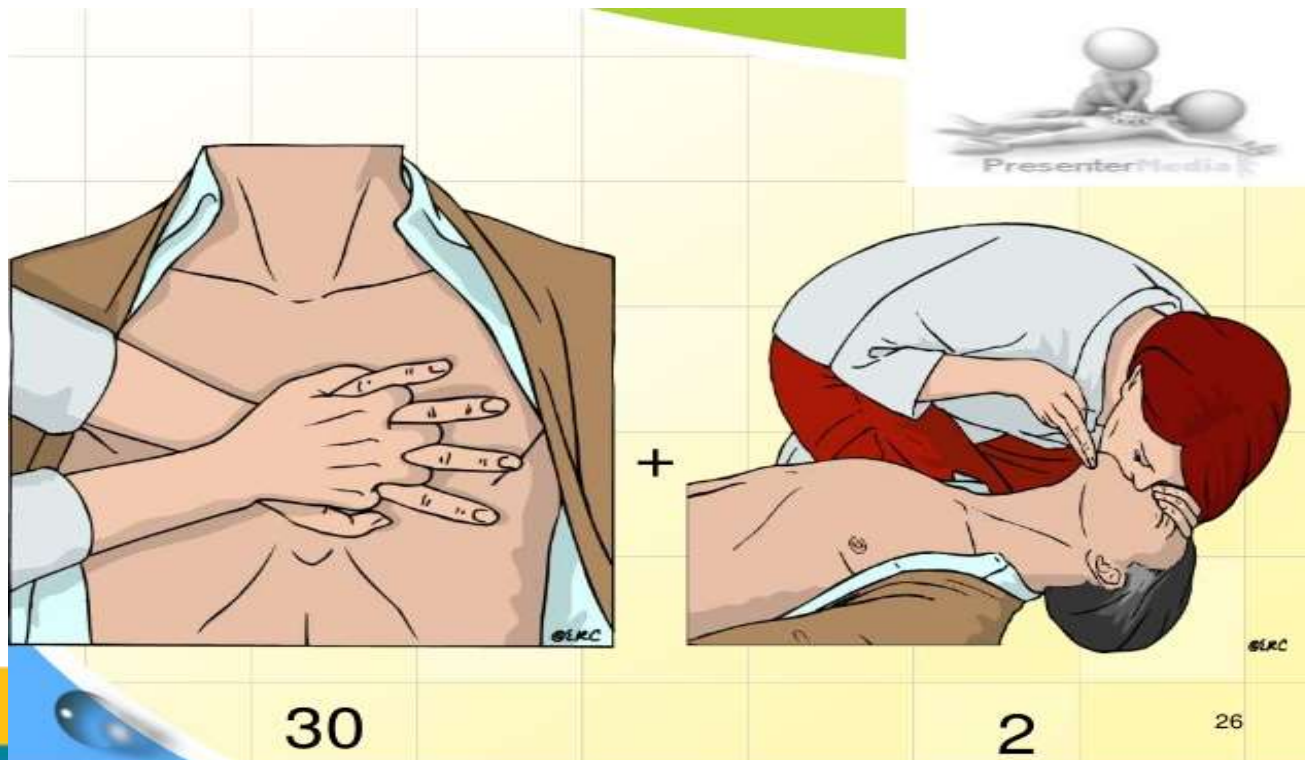
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- First of all trace the last rib and follow the rib to the notch where the ribs meet the sternum.
  - Then place the heel of the other hand over the lower part of the sternum about **1-1.5 inch** above the palpating hand.



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- The palpating hand is placed on the top of the hand ,which is resting on the sternum .Both hands should be parallel.
  - Keep fingers off the chest or interlocked .
  - If fingers are resting on the chest, force will be dissipated.



- The artificial breathing and the cardiac massage should correspond to the normal respiration and pulse rate.
- Ventilations are given between the cardiac compression without interrupting or slowing the rate of compressions.
- Thus, **60** cardiac compressions and **12** ventilations per **minute** ratio (**15:2** -for two rescuer) (**30:2**-for one rescuer)



# PREPARATION OF THE PATIENT AND THE ENVIRONMENT

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- Explain the procedure to the patient or his relatives in simple language.
- Ask them to leave the room to lessen distractions.
- The patient may be shifted to a hard surface or a hard board is placed under his thorax
- Remove aside the clothing, to observe for cardiac beats and respirations.
- Place the patient back on his back without any pillows. It helps in maintaining airways and giving external cardiac compressions .



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- Ensure fresh air in the room by opening windows and doors.
  - External cardiac massage must be started within 4-6 minutes following cardiac arrest or irreversible brain damage will occur as a result of oxygen deprivation and lack of circulation.



# PROCEDURE



## Step 1 Check responsiveness:

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- Determine unresponsiveness. Observe for spontaneous respiration, palpate carotid pulse, and ask the victim “**are you ok?**”





**Step 2.**Call for help

**Step 3.**place the victim in supine position.

**Step 4.**Kneel at the victims' side.

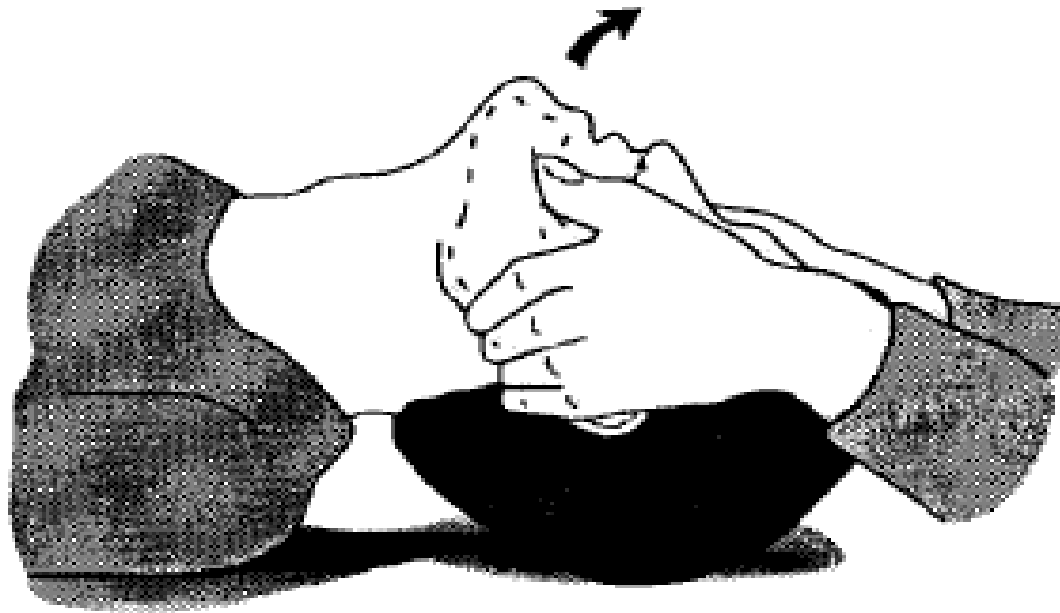
**Step 5.**Open the victims airway.

- a) Place one hand on patient's forehead and apply firm backward pressure with the palm to tilt the head back.
- b) Then place the fingers of the other hand under the bony part of the lower jaw near the chin and lift up the jaw to bring the jaw forward and the teeth almost to occlusion.

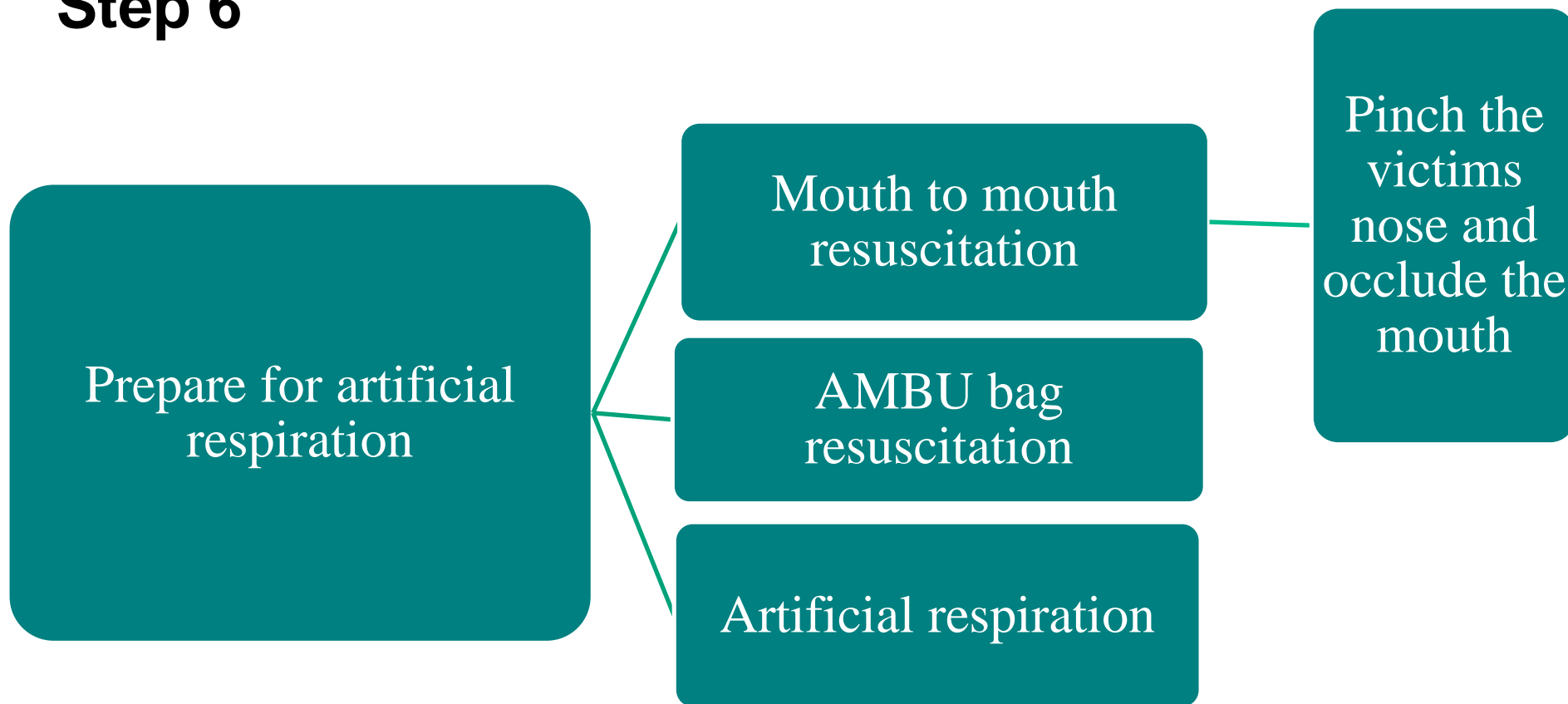


c) Grasp the angles of the patient's lower jaw and lifting with both the hands, one on each side, displace the mandible forward, while tilting the head backward.

d) The **jaw thrust technique** without head tilt is the safest method for opening the airway in the presence of suspected neck injury.



## Step 6



**Step 7.** Observe for the rise and fall of the chest wall with each respiration.

**Step 8.** Suction any secretions from the airway .if suction is unavailable then turn the victim's head to one side.



## **Step 9.** Assess for presence of carotid pulse:

- a) Carotid pulse is the most central and accessible artery in children over one year.
- b) Fingers are moved up the ribcage to notch where ribs meet the lower sternum in the centre of the lower part of the chest.
- c) Place the heel of the hand on the lower half of sternum and place the other hand or top of the hand on sternum so that hands are parallel
- d) Fingers may be extended or interlaced but should be kept off the chest.



**Step 10)** Lock elbows ,maintain arms straight and shoulders directly over hands on victim's sternum.

a. Compress chest 3-5 cms

b. Compress chest 80 -100 times /min.

c. Perform 15 external compressions with mnemonic (***one and two and three.....***)

d. Ventilate lungs with two slow rescue breaths .

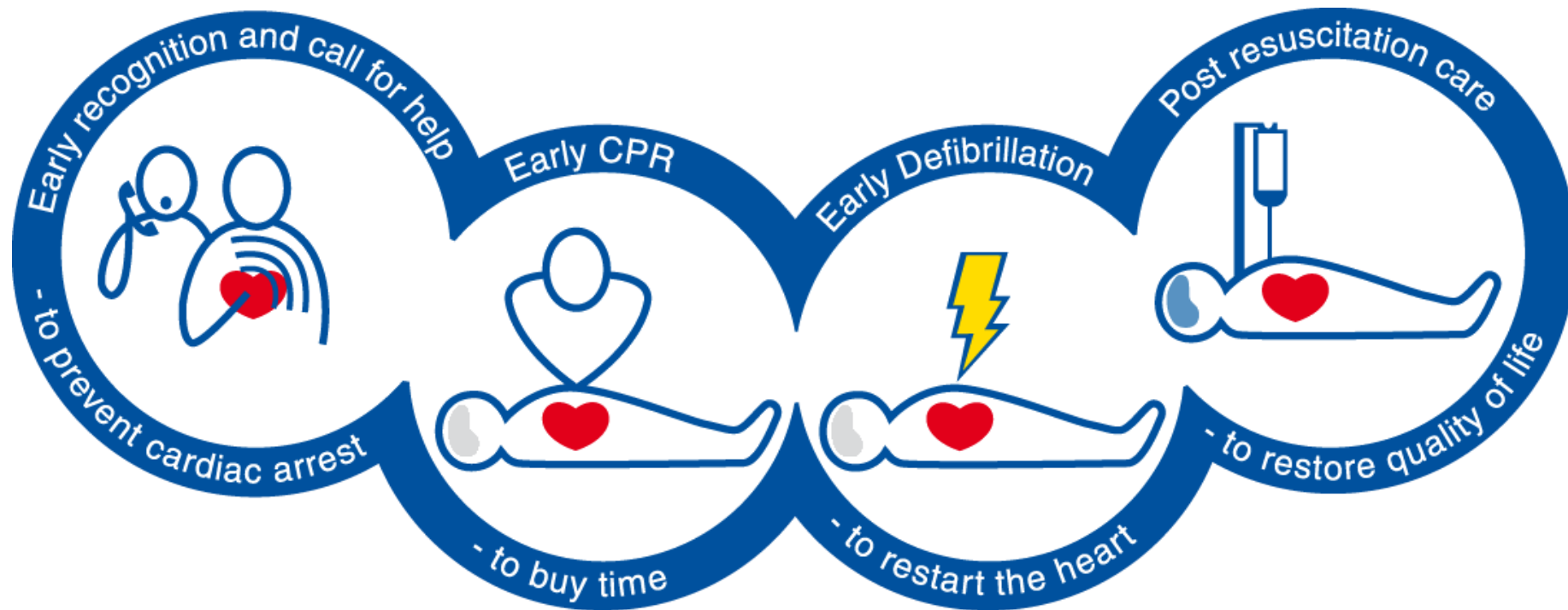
e. Reassess the victim after four complete cycles

**Step 11).** While resuscitation proceeds simultaneous efforts are made to obtain and use special resuscitation equipment to manage breathing and circulation and provide definitive care



# CHAIN OF SURVIVAL







# How to place in recovery position

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ADAM

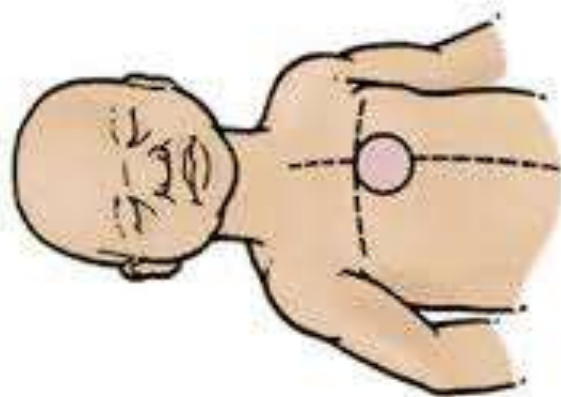


# INFANTS (1-12 MONTHS)



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- I. Draw an imaginary line between the nipples over the breast bone (sternum)
  - II. Place the index finger on the hand farthest from the infant's head just under the infra mammary line where it intersects

Skill Drill 20-2 Giving Chest Compressions to an Infant



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- Using the three fingers ,compress **1.3-2.5 cm(1/2-1 inches)** at least **100 times/min.**
  - At the end of the every fifth compression allow a pause for ventilation.(it promotes adequate ventilation during CPR)
  - Re assess the victim after 10 cycles **5:1.**



# Standing or sitting responsive adult:

- ❖ Activate the emergency response system.
- ❖ Stand behind the victim and wrap your arms around the victim's waist.
- ❖ Make a fist with one hand
- ❖ Place the thumb side of your fist against the victim's abdomen, in the midline.
- ❖ Grasp your fist with the other hand and press into the abdomen with a quick upward thrust. Repeat until object is expelled.

Cover your fist with your other hand and thrust up and in with sufficient force to lift the victim off his feet



ADAM.



# PAEDIATRIC BLS SEQUENCES

- Assess
  - D
  - R
  - S
  - A
  - B
  - C
- Infant, baby
- Child
- Get help
- CPR



- Assess

- **D**anger

- **R**

- **S**

- **A**

- **B**

- **C**

- Get help

- CPR



- Assess

- **D**
- **Response**
- **S**
- **A**
- **B**
- **C**

- Get help

- CPR





- Assess

- **D**
- **R**
- **Shout for help**
- **A**
- **B**
- **C**

- Get help

- CPR



- Assess

- D
- R
- S
- Airway
- B
- C

- Get help

- CPR

- Head tilt, chin lift

- Jaw thrust



- Assess

- **D**
- **R**
- **S**
- **A**
- **Breathing**
- **C**

- Get help

- CPR

- **Look**

- **Listen**

- **Feel**



- Assess

- **D**
- **R**
- **S**
- **A**
- **Breathing + 5 rescue breaths**
- **C**

- Get help

- CPR



- Assess

- **D**
- **R**
- **S**
- **A**
- **Breathing + 5 rescue breaths**
- **Circulation**

- Get help

- CPR

- **Signs of live**



- Assess

- **D**
- **R**
- **S**
- **A**
- **Breathing + 5 rescue breaths**
- **Circulation + chest compression**

- Get help
- CPR



# CHILD (1-7 YRS)



- Site: Lower margin of child's rib cage to notch where ribs and sternum
- Avoid compression over notch
- Place heel of nurse's hand over lower half of sternum (between nipple line and notch)
- Depth – 1 inch to 1 ½ inches
- Rate – 100 times per minute
- Ratio of cardiac compression to ventilation
- 2 persons – 5:1
- 1 person – 15:2

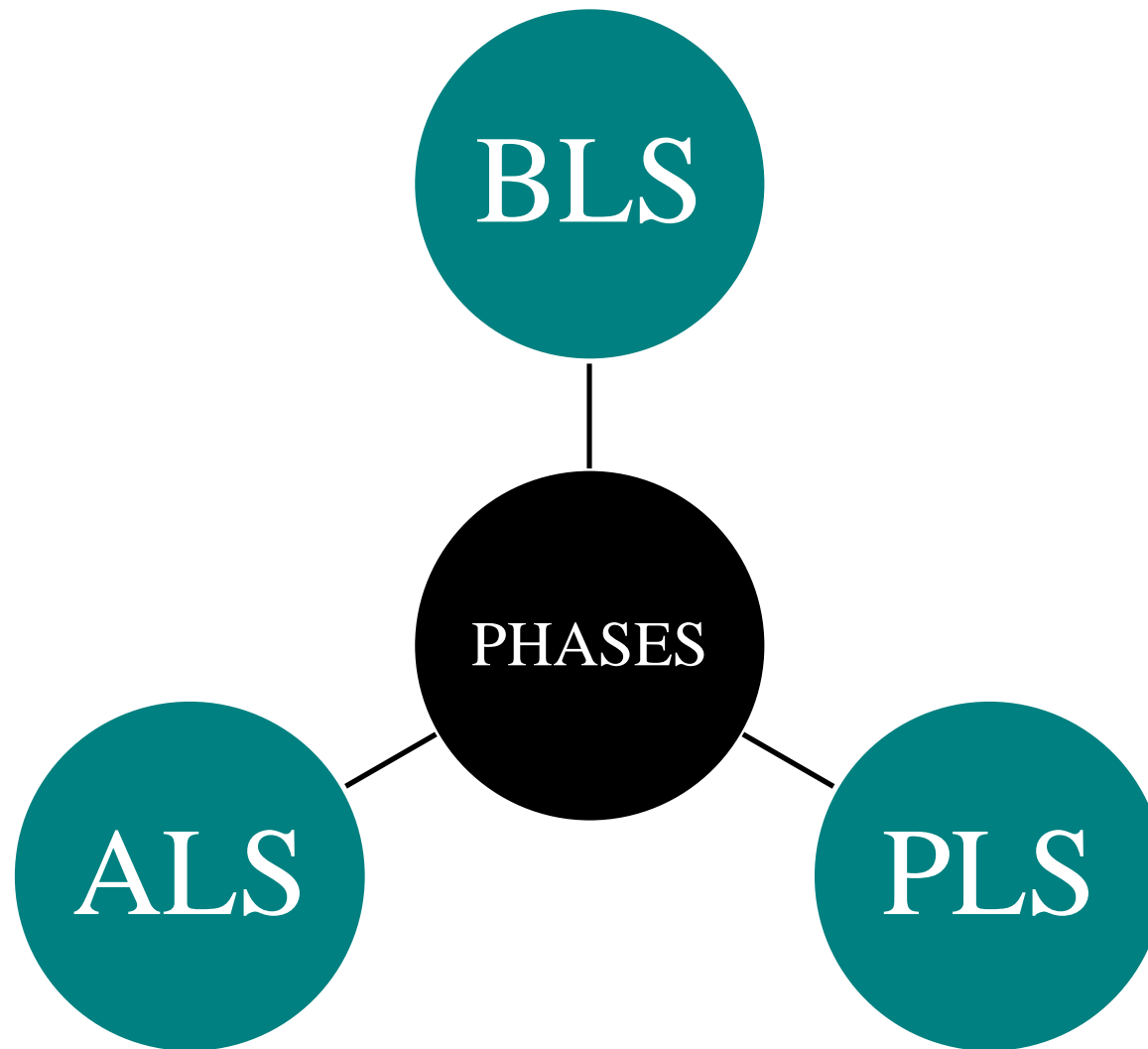




<b>1</b>	<b>Neonate, Premature or Small infant</b>	<b>-Supine position Encircle the chest with hands &amp; thumbs over the sternum(100-120 bpm)</b>	<b>1/2 to 3/4 inch (1.3 -1.9 cm)</b>	<b>≥100 bpm</b>
<b>2</b>	<b>Large infant</b>	<b>Place on a firm flat surface, support back, compress the mid sternum with the tips of the index &amp; middle fingers</b>	<b>1/2 to 1 inch</b>	<b>≥100bpm</b>
<b>3</b>	<b>Small child</b>	<b>Place on a flat firm surface, support the back, with the heel of one hand over the midsternum</b>	<b>1 to 1 1/2 inch</b>	<b>80-100 bpm</b>
<b>4</b>	<b>Larger child &amp; Adolscent</b>	<b>Place on fla, firm surface place the heel of one hand on the lower half of the sternum.If the child is bigger hand can be used like adult CPR</b>	<b>1 1/2 to 2 inch</b>	<b>80-100 bpm</b>

# PHASES OF CPR

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# BLS

AIRWAY  
CONTROL

BREATHING  
SUPPORT

CIRCULATION  
SUPPORT



# AIRWAY CONTROL

## Without equipment

- Backward tilt of the head.
- Supine aligned position  
stable side position.
- Lung inflation attempts
- Triple airway  
manoeuvre(jawthrust,open  
mouth)
- Manual cleaning of the  
mouth and throat
- Back blows manual thrust.

## With equipment

- Suction
- Endotracheal intubation
- Tracheostomy



# BREATHING SUPPORT

## WITHOUT EQUIPMENT

- Mouth to mouth ventilation

## WITH EQUIPMENT

- Manual bag mask ventilation with or without mechanical ventilation



# CIRCULATION SUPPORT

## WITHOUT EQUIPMENT

- Manual chest compressions
- Pulse checking

## WITH EQUIPMENT

- Open chest direct compression



# **ADVANCE LIFE SUPPORT(ALS)**

**Drugs and fluids**

**Electro- cardiograph**

**Fibrillation treatment**



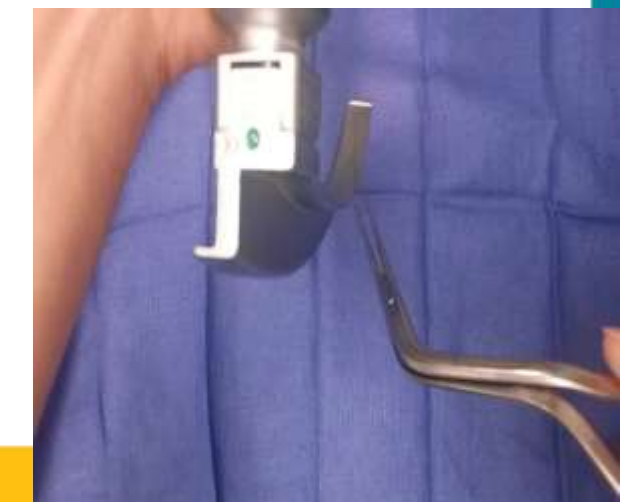
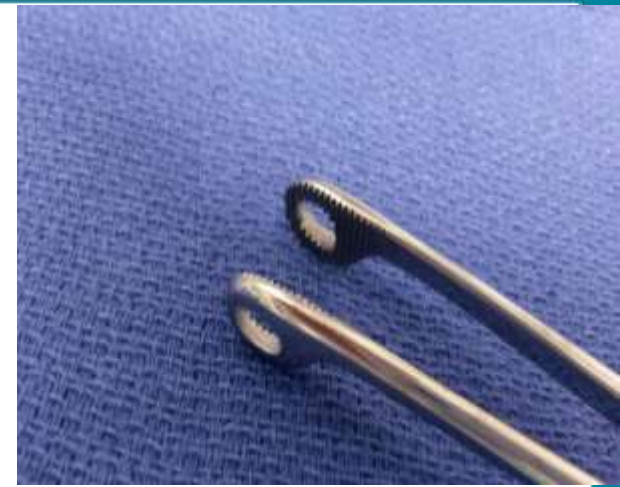
# PREPARATION OF ARTICLES





# A tray containing the following articles

1. Endotracheal tube(7,7.5,8)
2. AMBU bag
3. Stillet (in plastic cover) & Megal's Forceps
4. Suction tube catheter
5. a) laryngoscope with different sizes of blade  
b) Nasal Airway  
c) Oral airway  
d) A bowl with gauze pieces  
e) Lubricating gel



6. Adhesive tape with scissors

7. Local anesthetic spray

8. Gloves in cover

9. kidney tray

10. paperbag

11. Masks of various sizes

12. Local anesthetic drugs

13. Disposable syringes with needles

14. An intravenous set and a cut-down set

**Others:**

a) Oxygen inhalation, b) Suction point (central supply), c) Defibrillator



# TRAY CONTAINING EMERGENCY DRUGS



Inj.Adrenaline

Inj.Atropine

Inj.Digoxine

Inj.Sodiumbicarbonate

Inj.Dopamine

Inj.Efcorlin

Inj.Avil

Inj.Calcium carbonate

Inj.Lasix

Inj.Aminophylline

Inj.Isoptin

Inj.Calmpose

Inj.deriphylline



**PROLONGED LIFE  
SUPPORT(PLS)**

**Gauging**

**Human ventilation**

**Intensive care**



# SIGNS OF EFFECTIVE RESUSCITATION

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- Constriction of pupils, key sign that brain is sufficiently oxygenated.
- Distinct carotid pulsation with each cardiac compression.
- Blinking upon stimulation of eyelids.
- Breathing that begins spontaneously.
- Movement and struggling.
- Decreased cyanosis.



# SIGNS OF INEFFECTIVE RESUSCITATION

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- Incorrect resuscitative techniques.
- Heart is drained out of its blood by hemorrhage or cardiac tamponade.
- Blood supply to the heart is obstructed by the presence of pulmonary embolus.
- Severe chronic lung disease has destroyed lungs capacity to oxygenate the blood.
- Lungs are filled with vomitus as a rescue of aspiration during cardiac massage.



Step/Action	Adult over 12 years	Child 1 to 12 years	Infant under 1 year
<b>Compressions</b> Compression landmarks	In the center of chest		
Push hard and fast. Allow complete recoil	<b>2 hands:</b> Heel of 1 hand, second hand on top	<b>2 hands:</b> Heel of 1 hand, second on top Or <b>1 hand:</b> Heel of 1 hand only	2 fingers
Compression depth	at least 2 inches	about 2 inches	about 1 1/2 inches
Compression rate		100 to 120/min	
Compression Ventilation ratio		30:2	
<b>Airway Breaths</b>		Head tilt / chin lift 2 breaths at 1 second/breath	
Foreign body airway obstruction		Back blows Abdominal thrusts	Back slaps and chest thrusts
<b>Defibrillation</b>  AED	Use adult pads. Do not use child pads.	Use after 5 cycles of CPR. Use child pads if available. If not, use adult AED and pads.	



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*Thank You*

