

PEDIATRIC BASIC LIFE SUPPORT



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PEDIATRIC CHAIN OF SURVIVAL



1. prevention,
 2. early CPR,
 3. prompt access to the emergency response system,
 4. rapid PALS,
 5. integrated post- cardiac arrest care.
- the first 3 links: BLS

Overall about **6%** of children who suffer an out-of-hospital cardiac arrest and **8%** of those who receive prehospital emergency response resuscitation survive

RESCUERS

- ◉ Lay Rescuers
- ◉ Healthcare Providers

VICTIMS

- ◉ INFANT:<1Y/O
- ◉ CHILD:1Y/O until puberty (defined as breast development in females and the presence of axillary hair in males)
- ◉ ADULT:beyond puberty

SAFETY

Safety of Rescuer & Victim

- Always make sure that the area is safe for you & the victim.
- Move a victim only to ensure the victim's safety.

ASSESS RESPONSIVENESS

- ◉ Call the child's name if you know it, or ask loudly: "Are you okay?"
- ◉ Tap the victim (the bottom of the foot is a good place in infant &).
- ◉ Look for movement, answering or moaning

RESPONSIVE CHILD

- ◉ he or she will answer or move.
- ◉ Checking the child for any injuries or need of medical assistance
- ◉ Calling EMS

NONRESPONSIVE

(Shout for help, check breath)

- ◉ Regular breathing
 - ◉ No evidence of trauma
- ➡
- ◉ Recovery position
 - ◉ Call EMS

- ◉ Breathing but respiratory distress
- ➡
- ◉ Remain him/her in a position that is most comfortable
 - ◉ Call EMS

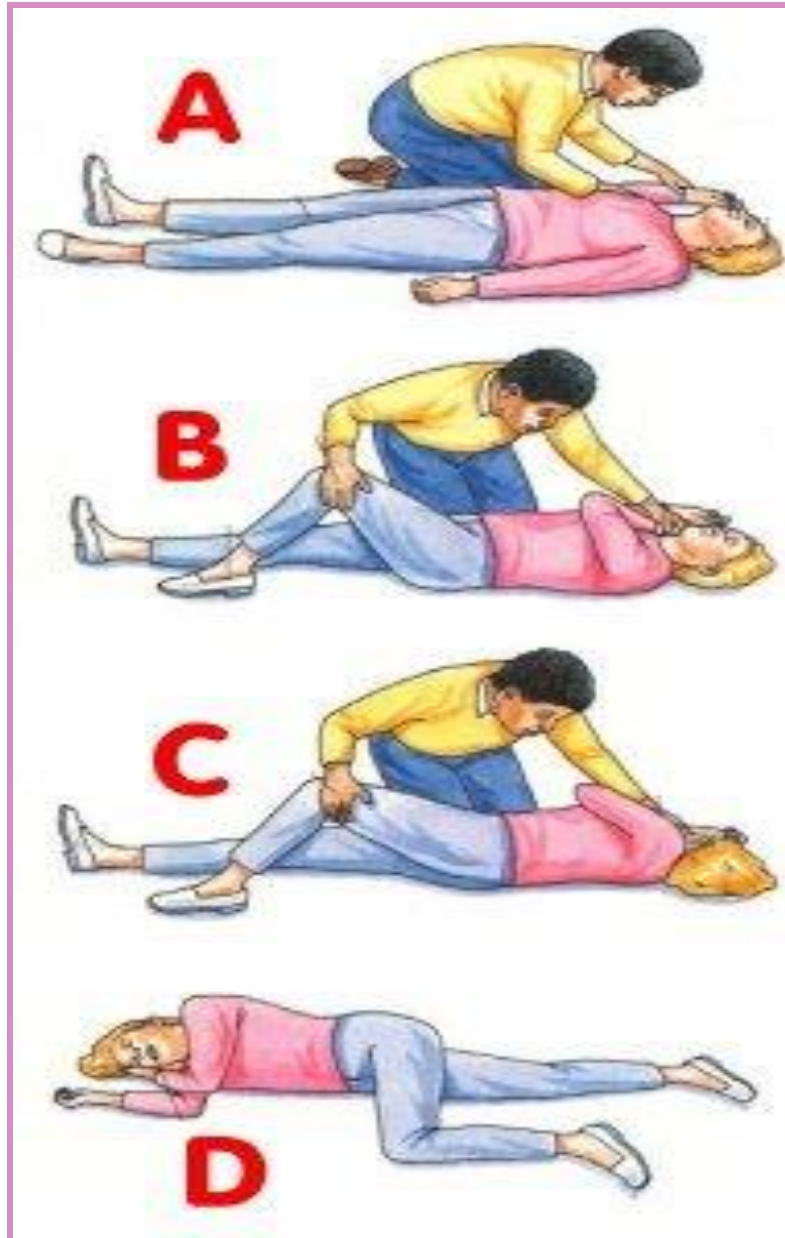


RECOVERY POSITION

- ◉ If the child is *breathing* & there is no evidence of trauma: turn the child onto the side (recovery position).



RECOVERY POSITION



UNRESPONSIVE

No Breathing or Gaspings

- ⦿ Start CPR.
- ⦿ Lone rescuer, continue CPR for 5 cycles (about 2 min) then call EMS
- ⦿ Two rescuers: one continues CPR and other call EMS

UNRESPONSIVE CHILD

- ◉ If you are alone & there is no evidence of trauma, you may carry a small child with you to the telephone.
- ◉ If the child must be moved for safety reasons, support the head & body to minimize turning, bending, or twisting of the head & neck.

CARRYING A SMALL CHILD TO THE TELEPHONE

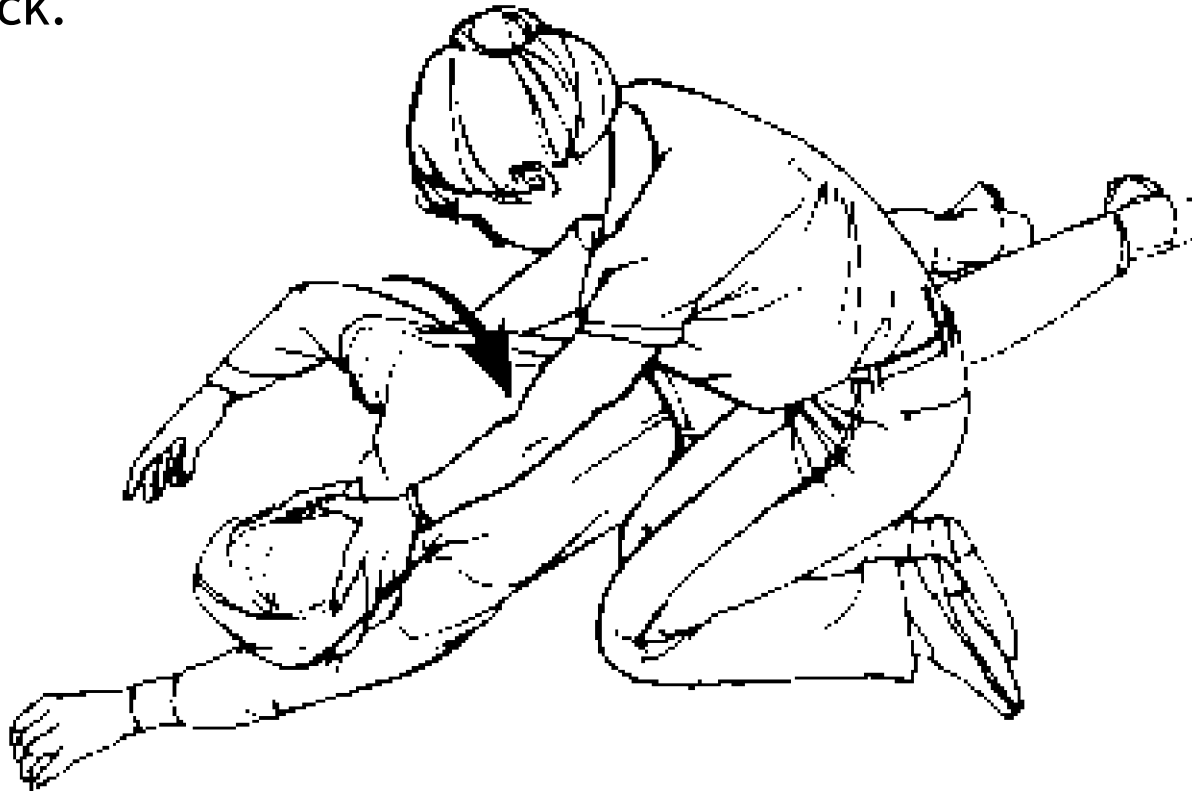


ACTIVATE THE EMS SYSTEM & GET THE AED

- ◉ If the arrest is witnessed & sudden (e.g., an athlete who collapses on the playing field), a lone healthcare provider should activate the EMS system & get an AED before starting CPR
- ◉ If two rescuers, one continues CPR and the other activates EMS
- ◉ If one rescuer and the arrest is not witnessed, continue CPR for 2 min then activate EMS

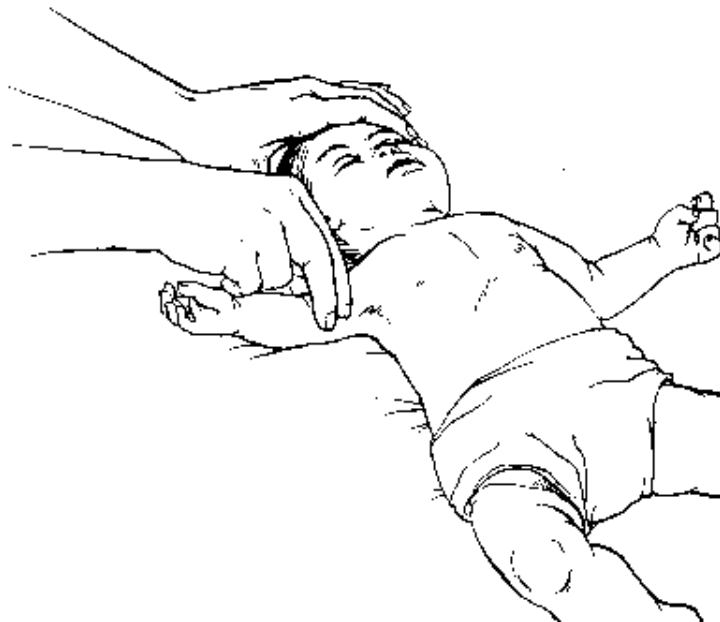
POSITION THE VICTIM

- ◉ If the victim is unresponsive, make sure that the victim is in a supine position on a flat, hard surface, such as a sturdy table, the floor, or the ground.
- ◉ If you must turn the victim, minimize turning or twisting of the head & neck.



PULSE CHECK

- ◉ Brachial in an infant & carotid or femoral in a child
- ◉ Take no more than 10 s
- ◉ Profound bradycardia [PR < 60 bpm + signs of poor perfusion (i.e., pallor, cyanosis)] despite oxygenation & ventilation: chest compressions



BRACHIAL PULSE CHECK



DEFINITE PULSE

- ◉ Give one breath every 3-5 seconds(12-20/min)
- ◉ Open the airway using a head tilt-chin lift maneuver or jaw thrust
- ◉ (lay rescuers use head tilt-chin lift maneuver for both injured and noninjured victims)

NO PULSE

- ◉ Do chest compression &
- ◉ breathing

WHEN CHECK PULSE AGAIN

- Reassess the pulse about every 2 minutes but spend no more than 10 seconds

CHEST COMPRESSIONS

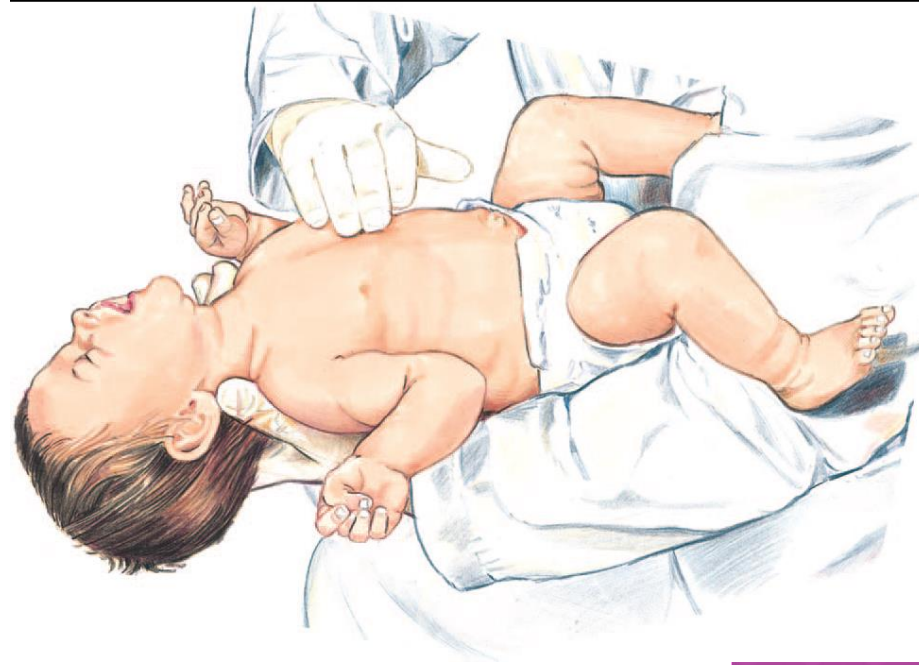
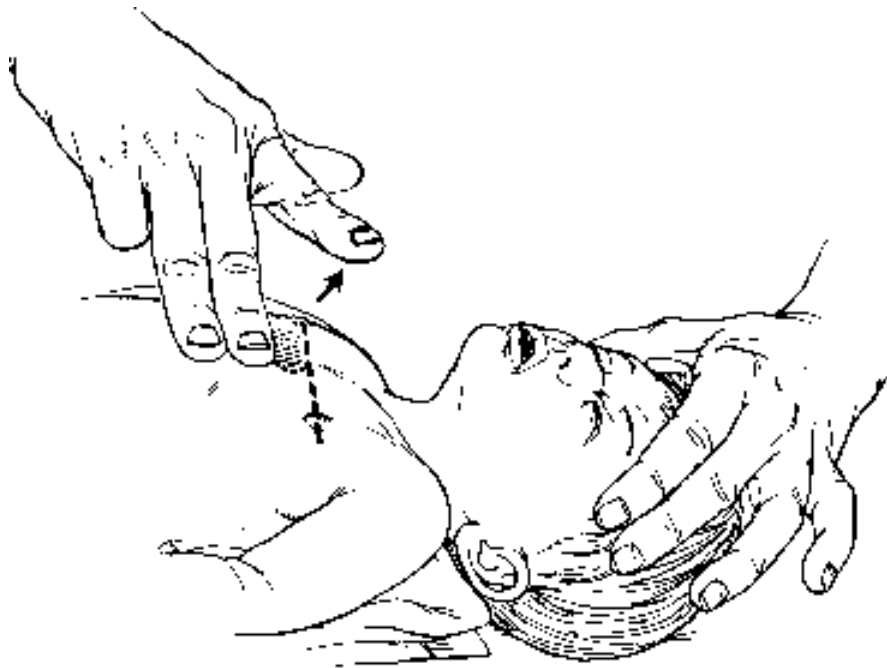
- ⦿ Compress the lower half of the sternum.
- ⦿ Do not compress over the xiphoid.
- ⦿ After each compression allow the chest to recoil fully to improve blood flow into the heart.
- ⦿ Lift your hand slightly off the chest at the end of each compression.

CHEST COMPRESSIONS

- ◉ ***“Push hard”***: to depress the chest approximately $\frac{1}{3}$ the anterior-posterior diameter of the chest
- ◉ ***Compress 4cm in infant & 5 cm in >1yr***
- ◉ ***“Push fast”***: at a rate of at least 100 compressions/min.
- ◉ ***Release completely to allow the chest to fully recoil.***
- ◉ ***Minimize interruptions in chest compressions.***

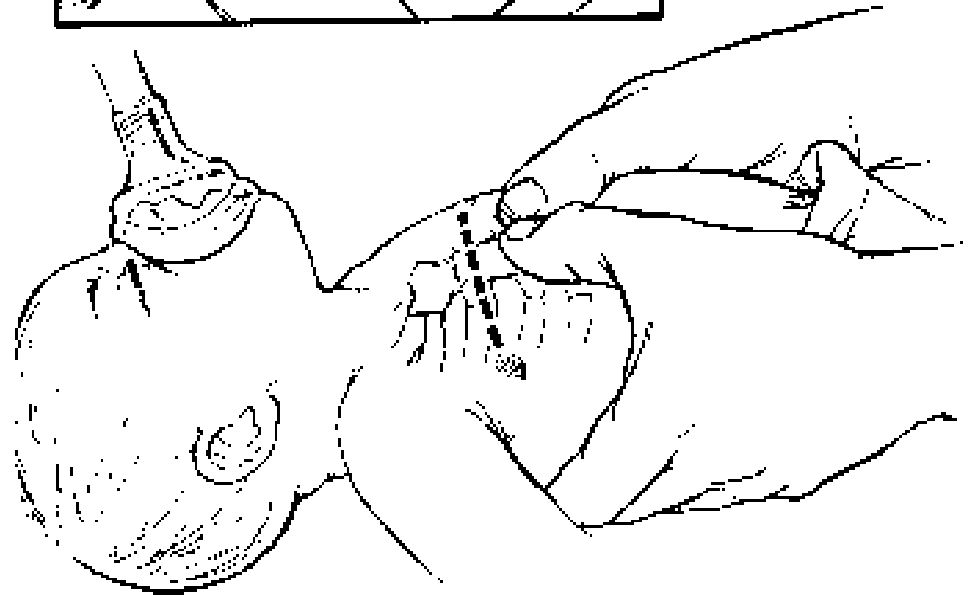
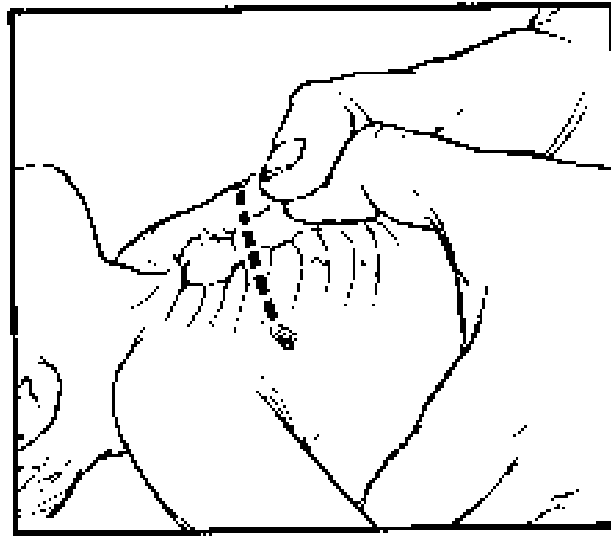
2-FINGER CHEST COMPRESSION TECHNIQUE IN INFANT

- ◉ For lay rescuers & lone rescuers
- ◉ Place 2 fingers just below the inter-mammary line.



HAND POSITION FOR CHEST ENCIRCLEMENT

- Encircle the infant's chest with both hands; spread your fingers around the thorax, & place your thumbs together over the lower half of the sternum.
- Forcefully compress the sternum with your thumbs



2 THUMB-ENCIRCLING HANDS CHEST COMPRESSION IN INFANT (2 RESCUERS)

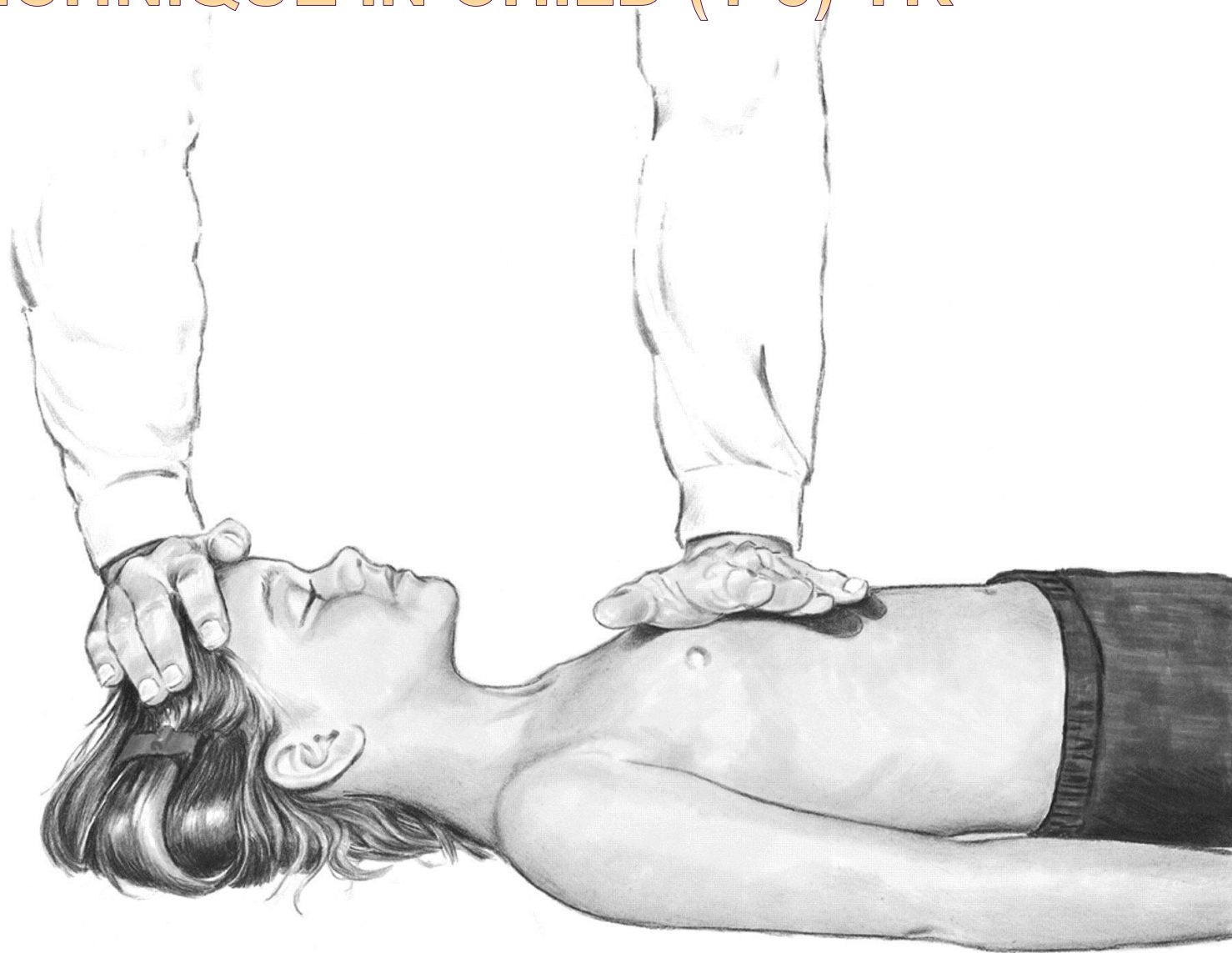


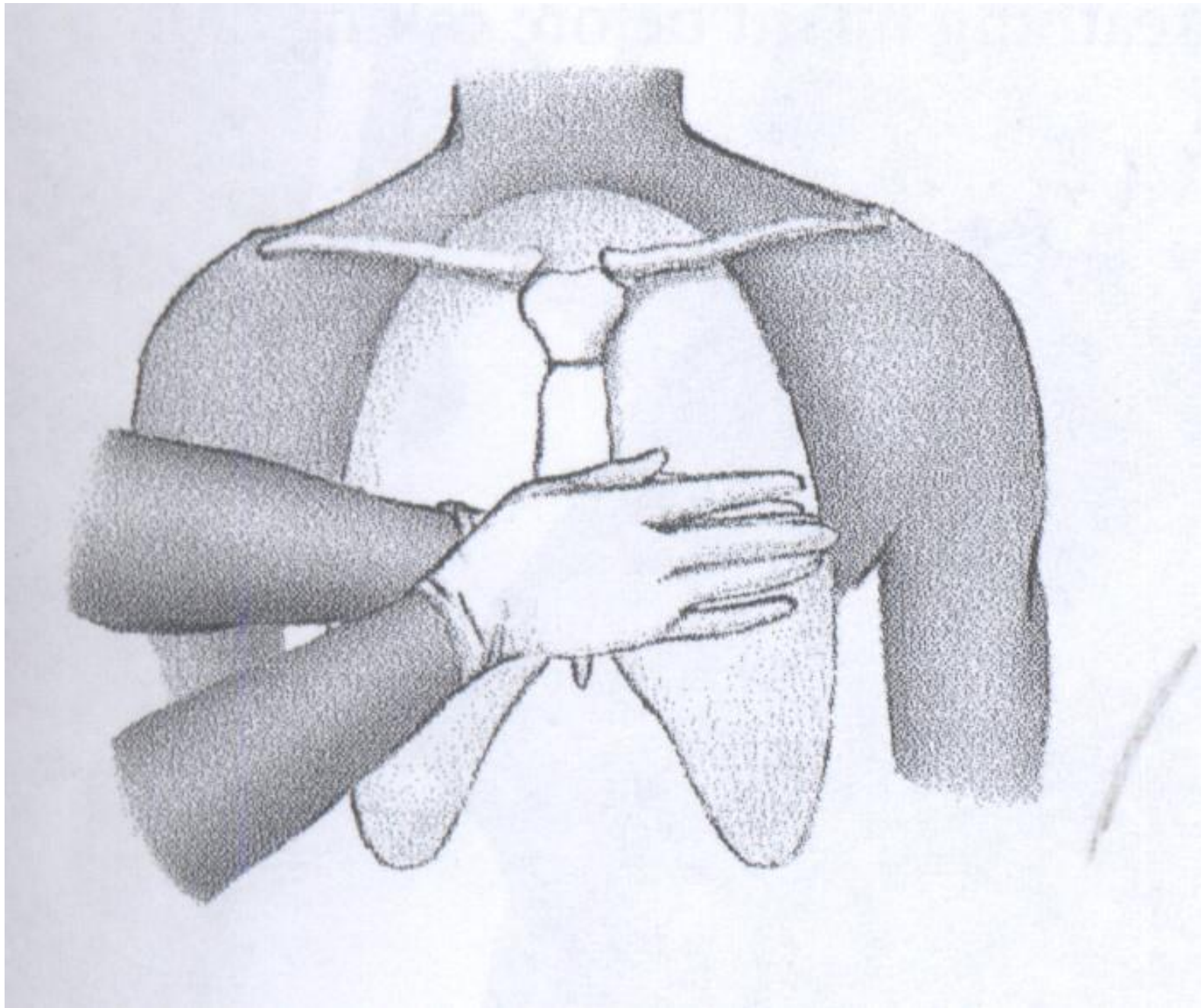
CHEST COMPRESSIONS

- ❖ In older children → the lower third of the sternum
- ❖ Maintain continuous head tilt with hand on forehead
- ❖ One hand
- ❖ 100/minute
- ❖ 1/3 of chest



ONE-HAND CHEST COMPRESSION TECHNIQUE IN CHILD (1-8) YR





Down-
stroke

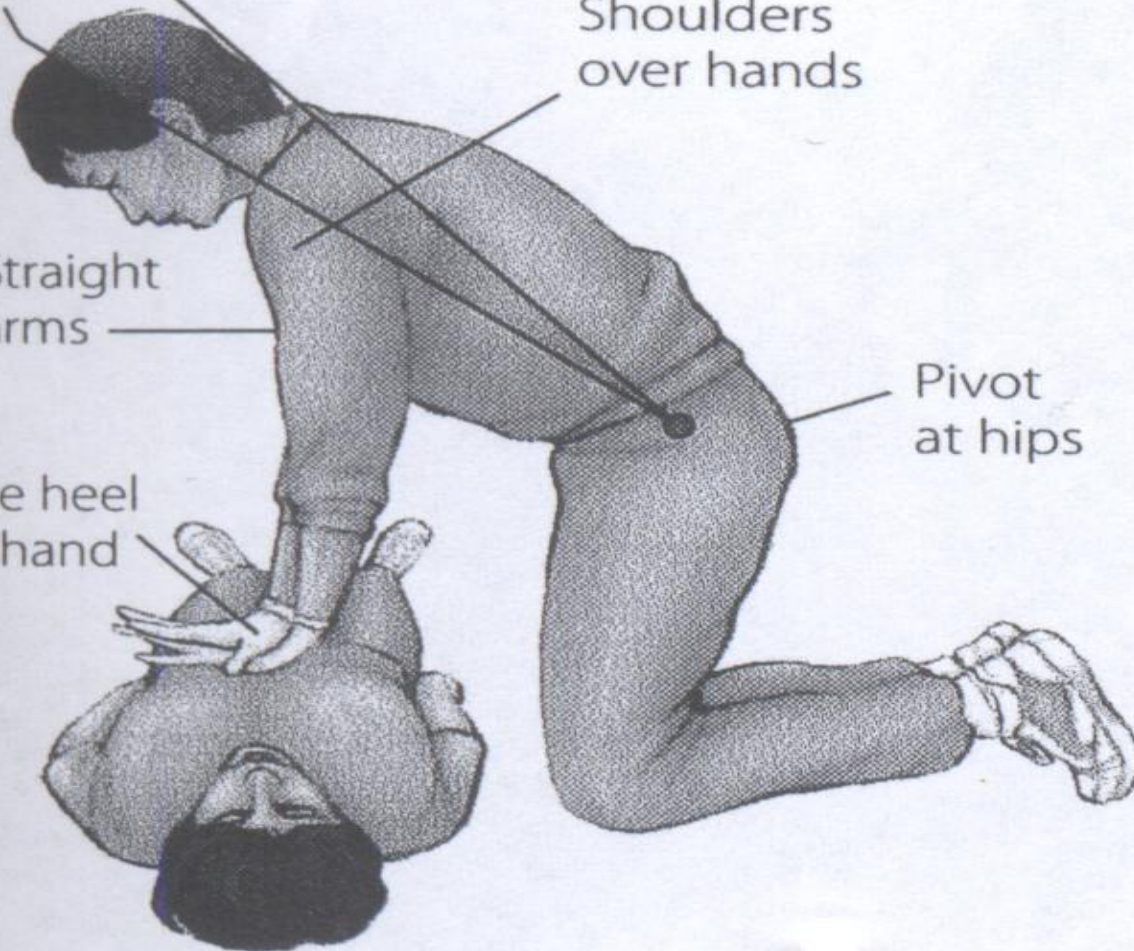
Upstroke

Shoulders
over hands

Straight
arms

Pivot
at hips

Use heel
of hand

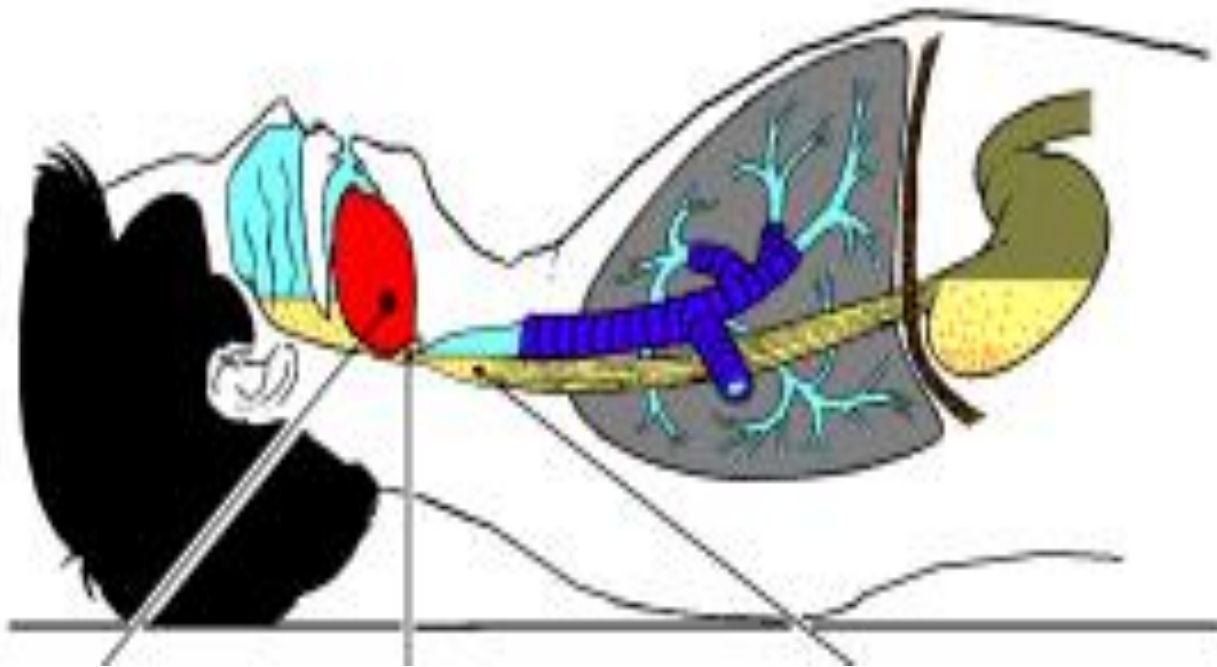


VENTILATIONS

INADEQUATE BREATHING WITH PULSE

- After 30 compressions (15 compressions if 2 rescuers), open the airway with a head tilt- chin lift and give 2 breaths. If there is evidence of trauma that suggests spinal injury, use a jaw thrust without head tilt to open the airway

NONRESPONSIVE TONGUE & EPIGLOTTIS BLOCK AIRWAY



CERVICAL SPINAL PRECAUTIONS

- ◉ For a healthcare provider with suspecting a C-spine injury: jaw thrust without head tilt
- ◉ Use a head tilt– chin lift maneuver if the jaw thrust does not open the airway.

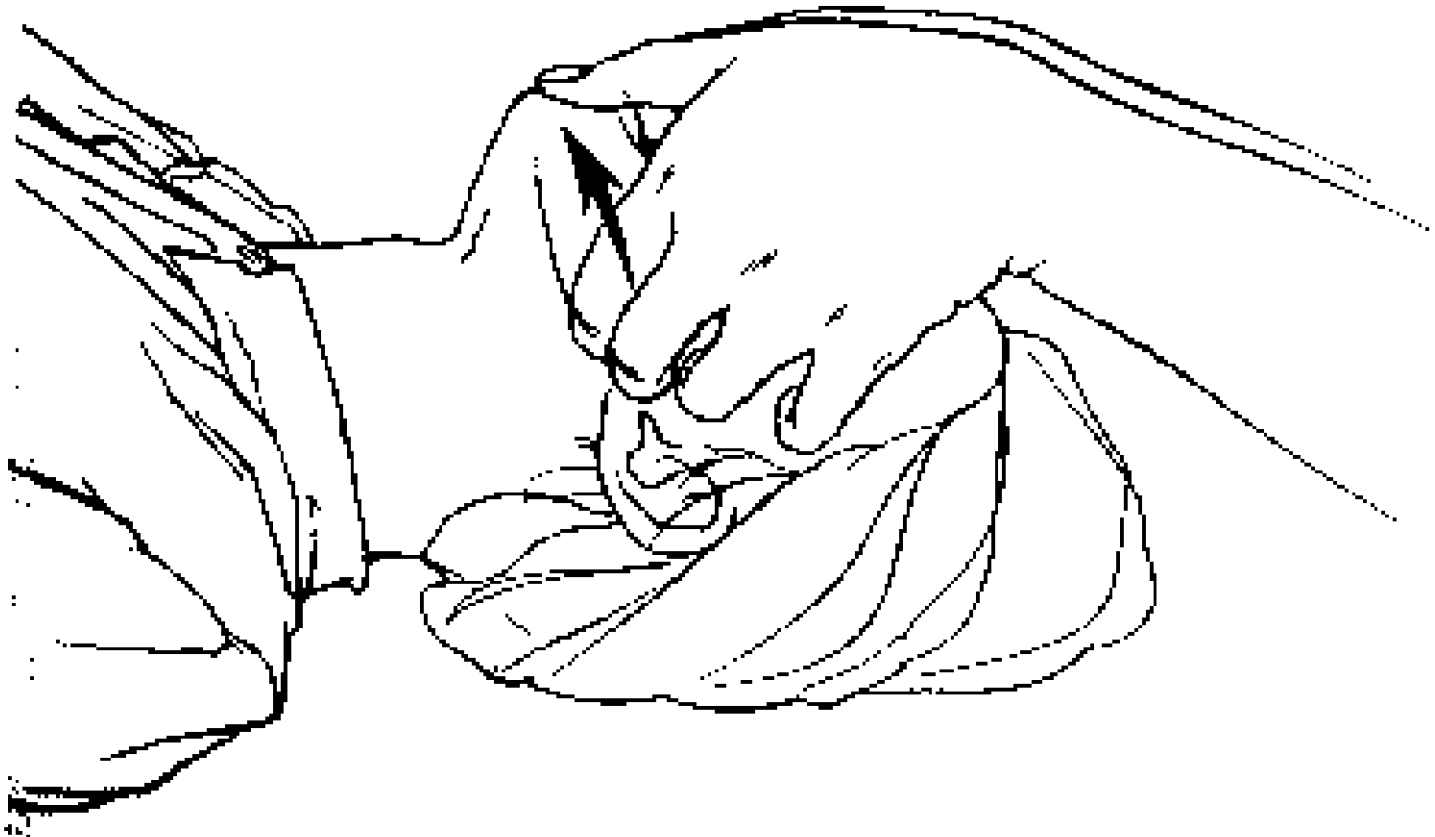
OPENING THE AIRWAY

- ◉ Airway obstruction produced by the tongue & the epiglottis
- ◉ Relief by head-tilt/chin-lift



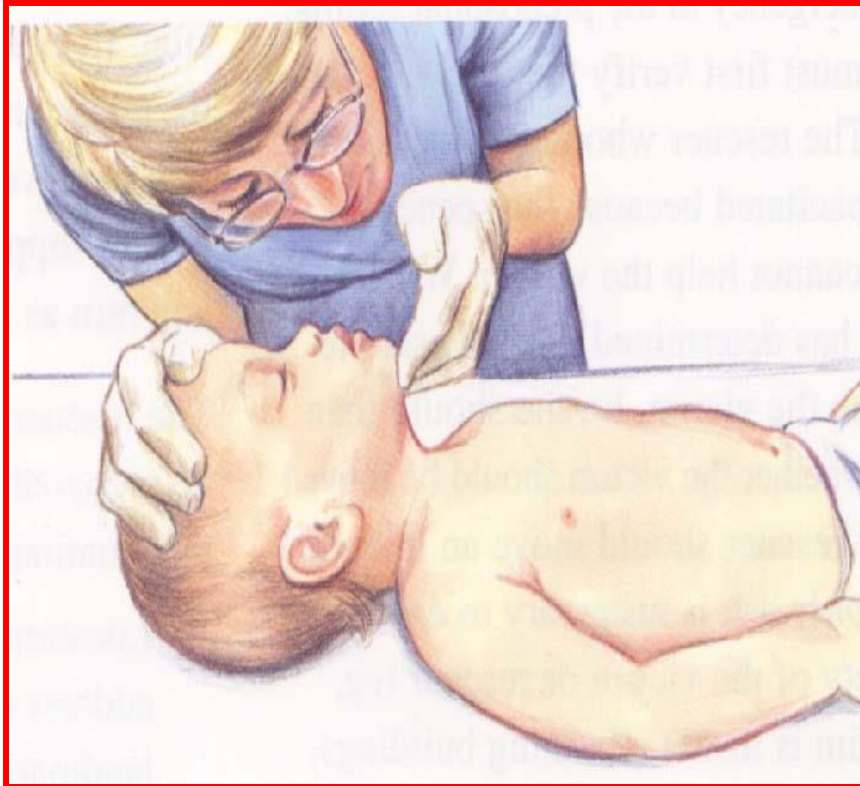


JAW-THRUST MANEUVER

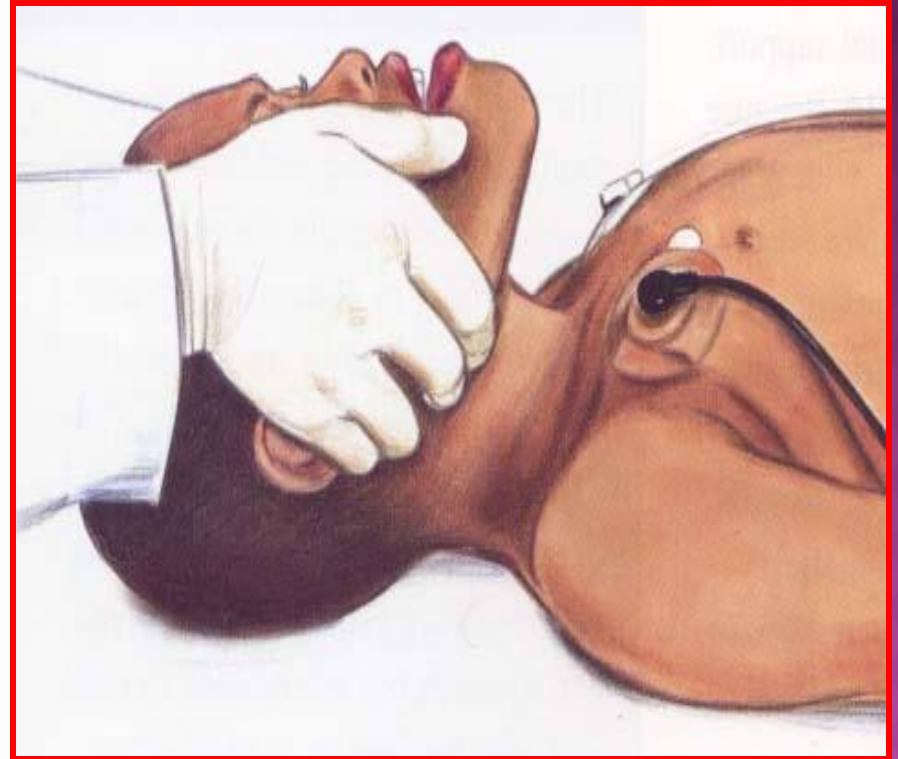


AIRWAY MANAGEMENT

Head Tilt-Chin Lift

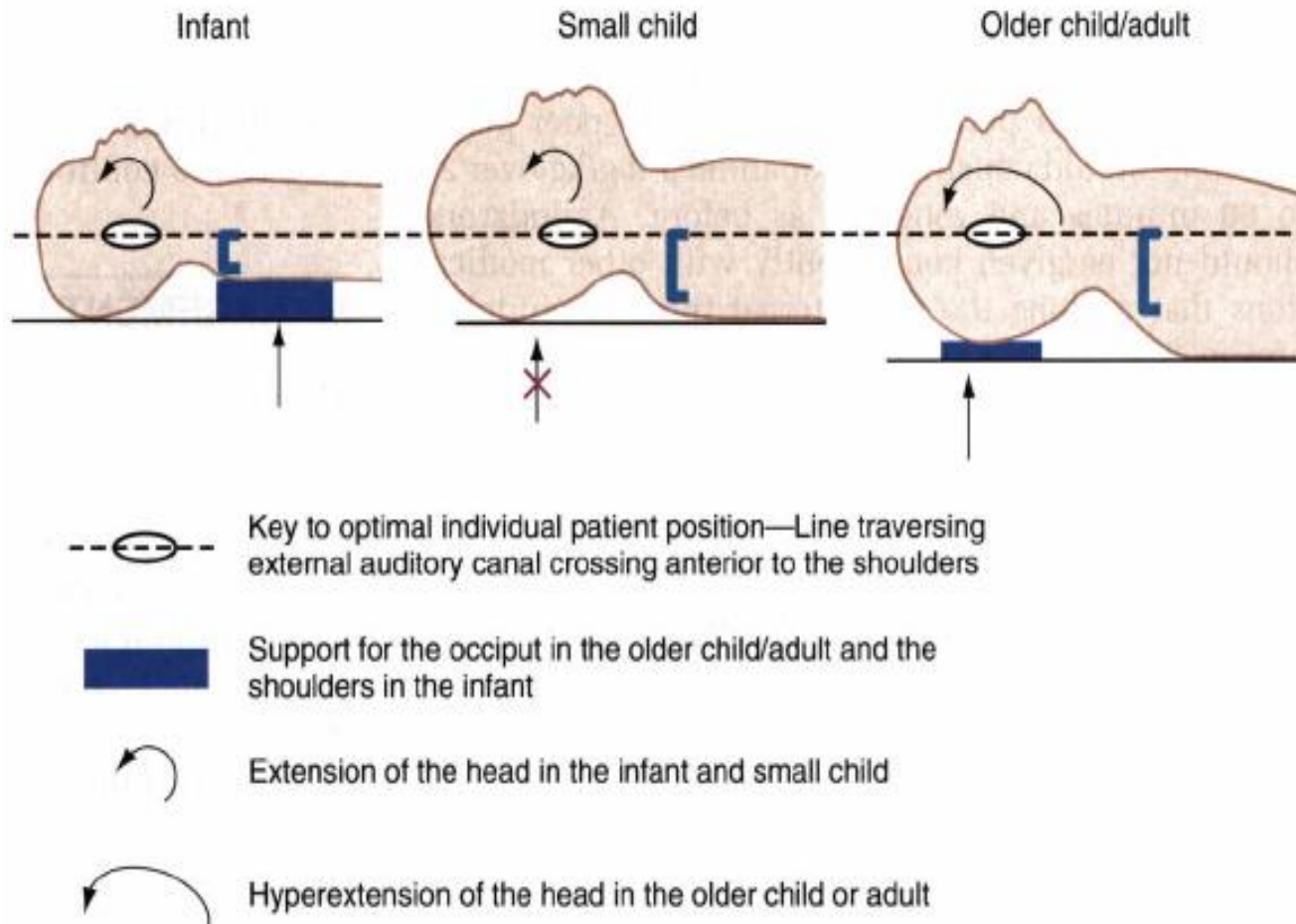


Jaw Thrust



Avoid extreme hyperextension

CORRECT (SNIFFING) POSITION FOR MAXIMAL AIRWAY PATENCY



RESCUE BREATHING

- Maintain an open airway & give 2 breaths.
 - Make sure that the breaths are effective (i.e., the chest rises).
 - If the chest does not rise, reposition the head, make a better seal, & try again.

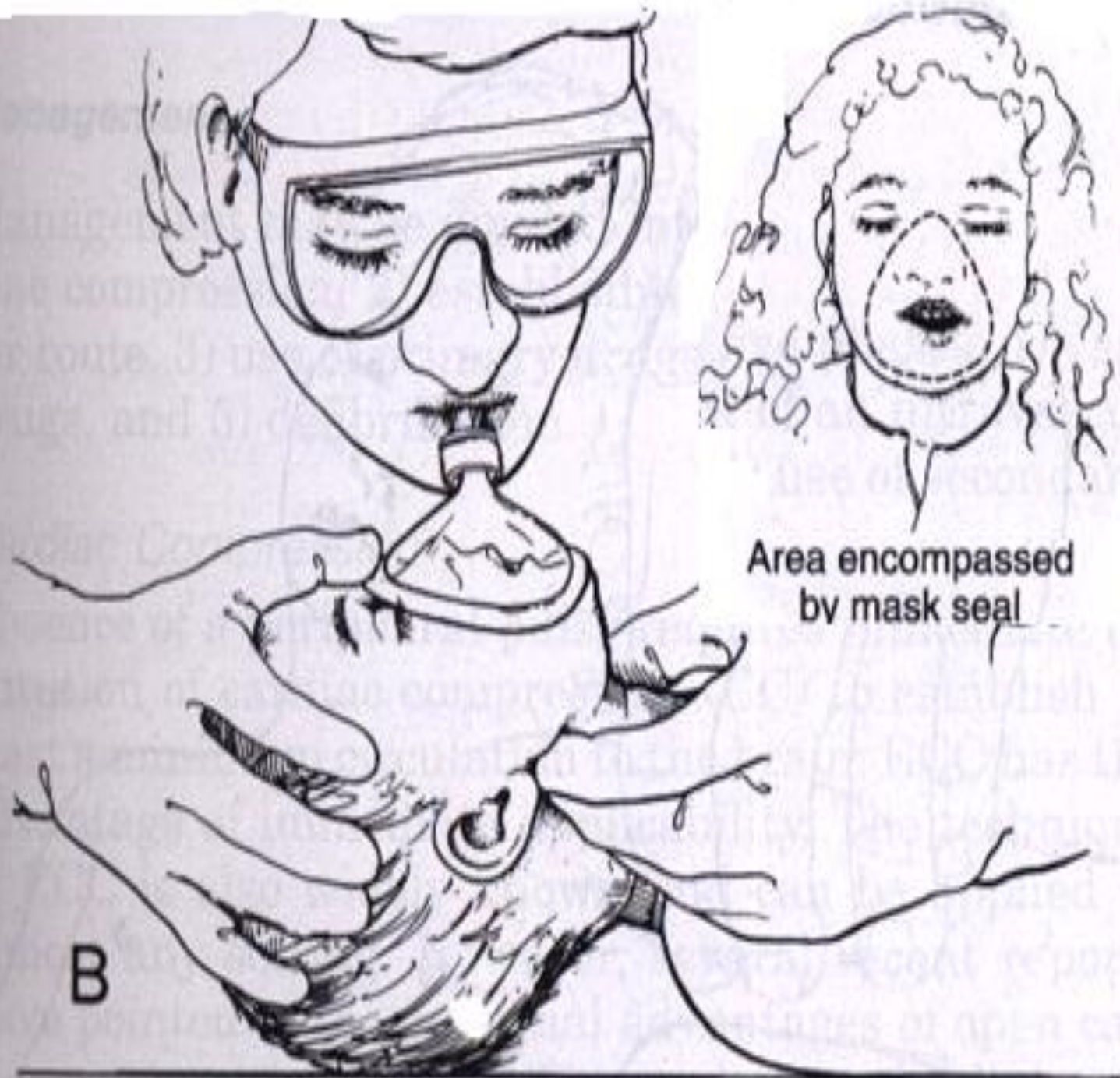
COMMENTS ON TECHNIQUE

- ◉ In an infant, use a mouth-to-mouth-&-nose technique .
- ◉ In a child, use a mouth-to-mouth technique.
- ◉ If you use the mouth-to-mouth technique, pinch the nose closed.
- ◉ If you use the mouth-to-nose technique, close the mouth.



BARRIER DEVICES

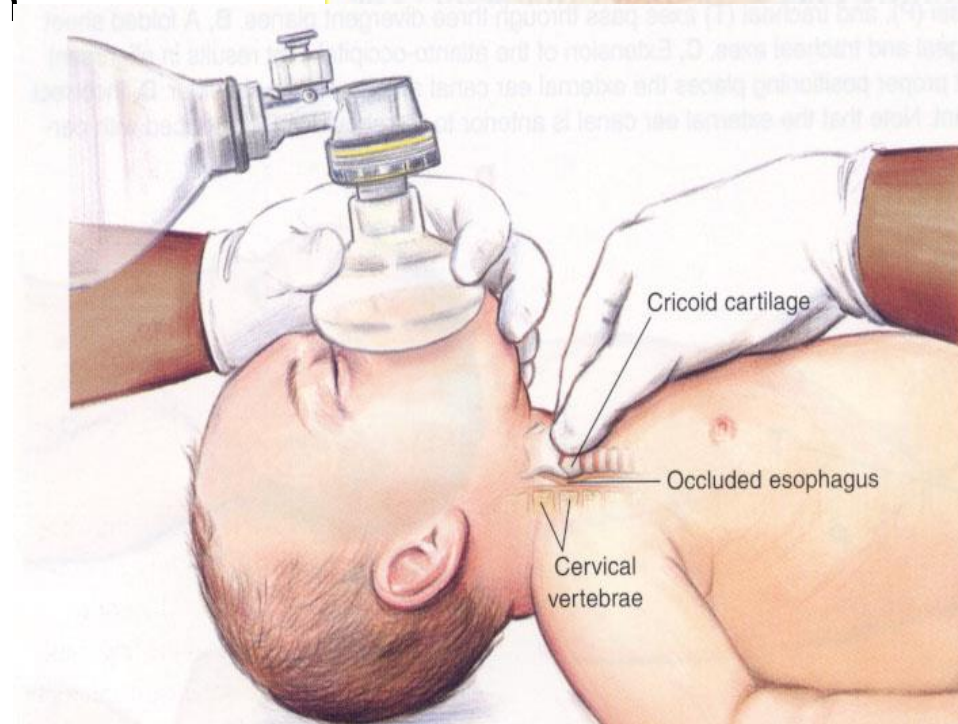
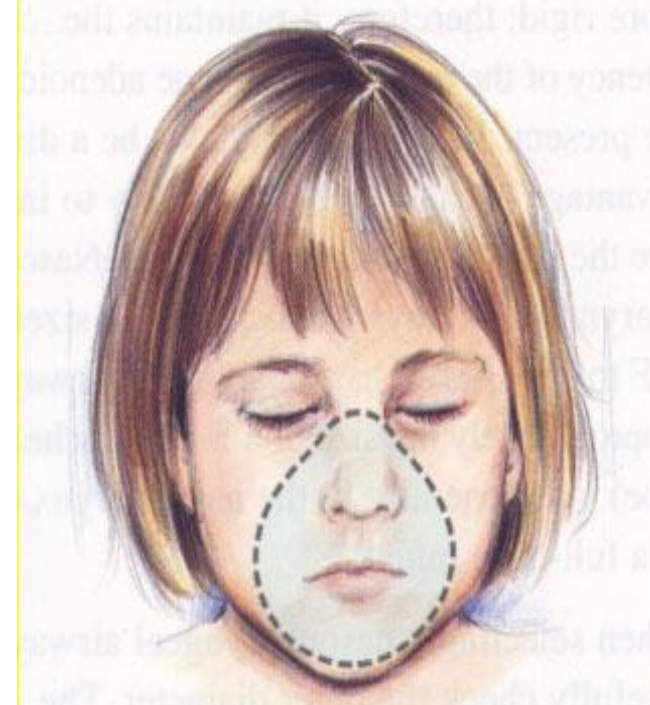
- ◉ Despite its safety, some healthcare providers & lay rescuers may hesitate to give mouth-to-mouth rescue breathing & prefer to use a barrier device.
- ◉ Barrier devices have not reduced the risk of transmission of infection, & some may increase resistance to air flow.
- ◉ If you use a barrier device, do not delay rescue breathing.





BAG-MASK VENTILATION

- Can be as effective as ETI & safer when providing ventilation for short periods
- In the out-of-hospital setting, preferentially ventilate & oxygenate infants & children with a bag & mask rather than attempt intubation ***if transport time is short*** .



VENTILATION BAGS

- ◉ Use a self-inflating bag with a volume of at least 450-500 ml.
- ◉ Even with an oxygen inflow of 10 L/min, the concentration of delivered oxygen varies from 30-80%.
- ◉ To deliver a high oxygen concentration (60-95%), attach an oxygen reservoir to the self-inflating bag.
- ◉ You must maintain an oxygen flow of 10-15 L/min into a reservoir attached to a pediatric bag & a flow of at least 15 L/min into an adult bag.

PRECAUTIONS

- ⦿ Avoid hyperventilation; use only the force & V_T necessary to make the chest rise.
- ⦿ Give each breath over 1 s.

EXCESSIVE VENTILATION

- ⦿ Impedes venous return & therefore decreases CO, & coronary perfusion by increasing intra-thoracic pressure
- ⦿ Causes air trapping & baro-trauma in patients with small airway obstruction
- ⦿ Increases the risk of regurgitation & aspiration

GASTRIC INFLATION & CRICOID PRESSURE

- ◉ Apply cricoid pressure. Do this only in an unresponsive victim & if there is a second rescuer. Avoid excessive pressure so as not to obstruct the trachea.

COORDINATE CHEST COMPRESSIONS AND VENTILATIONS

A lone rescuer uses a compression-to-ventilation ratio of 30:2.

For 2-rescuer infant and child CPR, one provider should perform chest compressions while the other keeps the airway open and performs ventilations at a ratio of 15:2

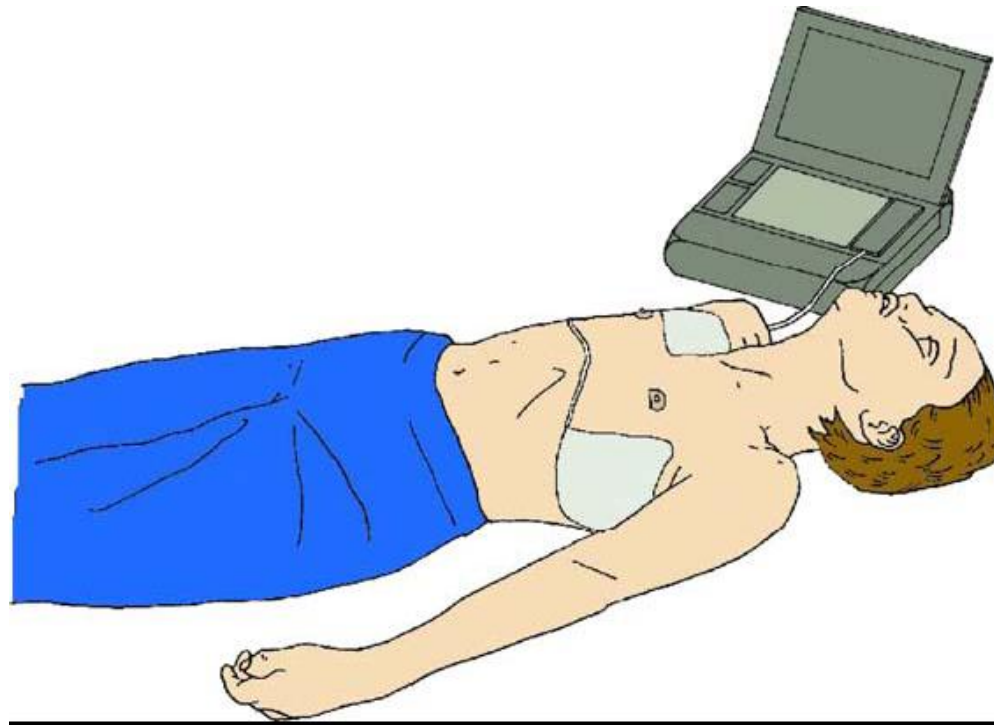
Deliver ventilations with minimal interruptions in chest compressions

COORDINATE CHEST COMPRESSIONS AND BREATHING

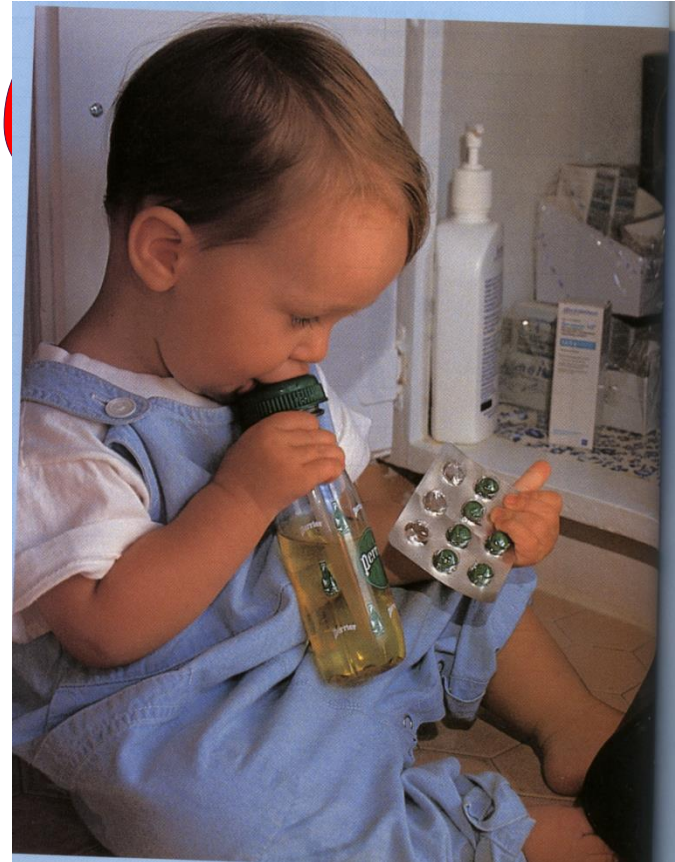
- ◉ No advanced airway in place: pause after 30 compressions (1 rescuer) or 15 compressions (2 rescuers) to give 2 ventilations when using either mouth-to-mouth or bag-mask technique
- ◉ An advanced airway in place: chest compression at a rate of 100 per min w/o pauses for ventilations, & ventilation at a rate of 8-10 bpm
- ◉ Change the compressor role approximately q 2 min (ideally in < 5 s) to prevent compressor fatigue & deterioration in quality & rate of chest compressions.

DEFIBRILLATION

- ◉ Using an AED in infants < 1 y/o?
- ◉ Use a standard AED if an AED with a pediatric attenuating system is not available.



FOREIGN BODY AIRWAY OBSTRUCTION CHOCKING



FBAO (CHOKING)

◉ Epidemiology & Recognition

- More than 90% of deaths occur in children < 5 y/o.
- Signs: a *sudden* onset of respiratory distress with coughing, gagging, stridor, or wheezing

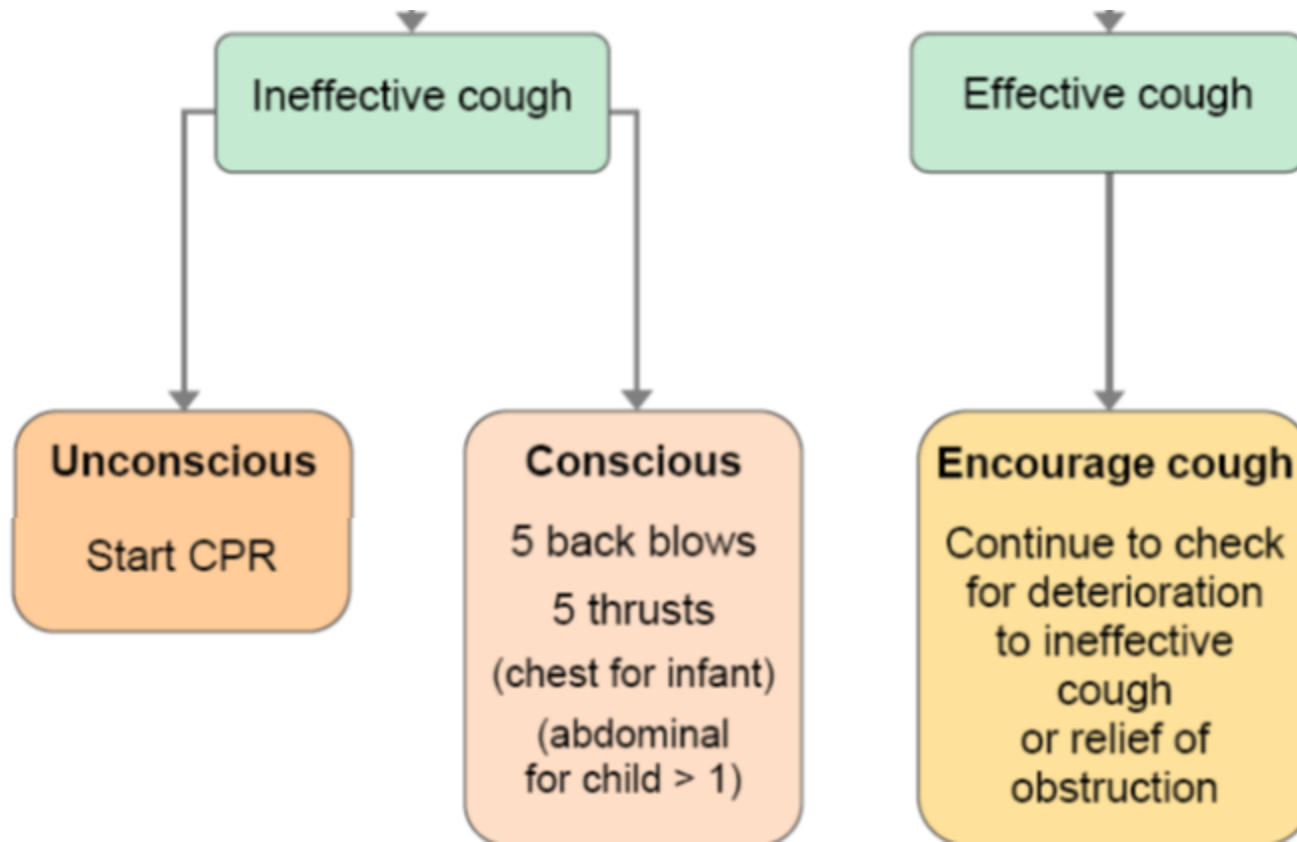
FBAO (CHOKING)

- **Severe airway obstruction**

- The victim cannot cough or make any sound.

- **Mild airway obstruction**

- The child can cough & make some sounds.



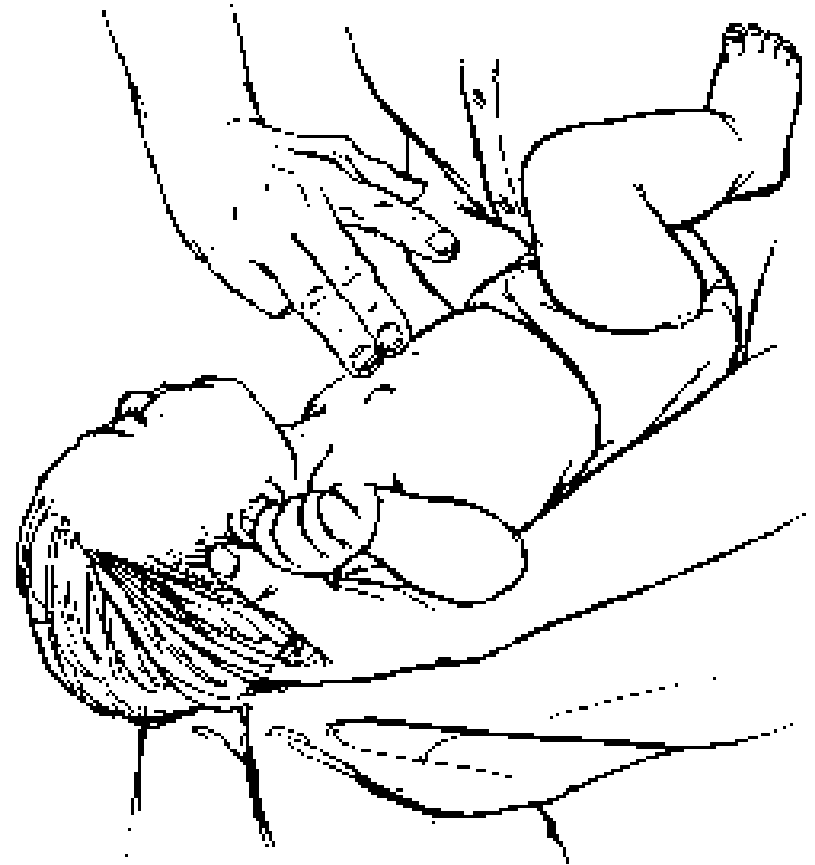
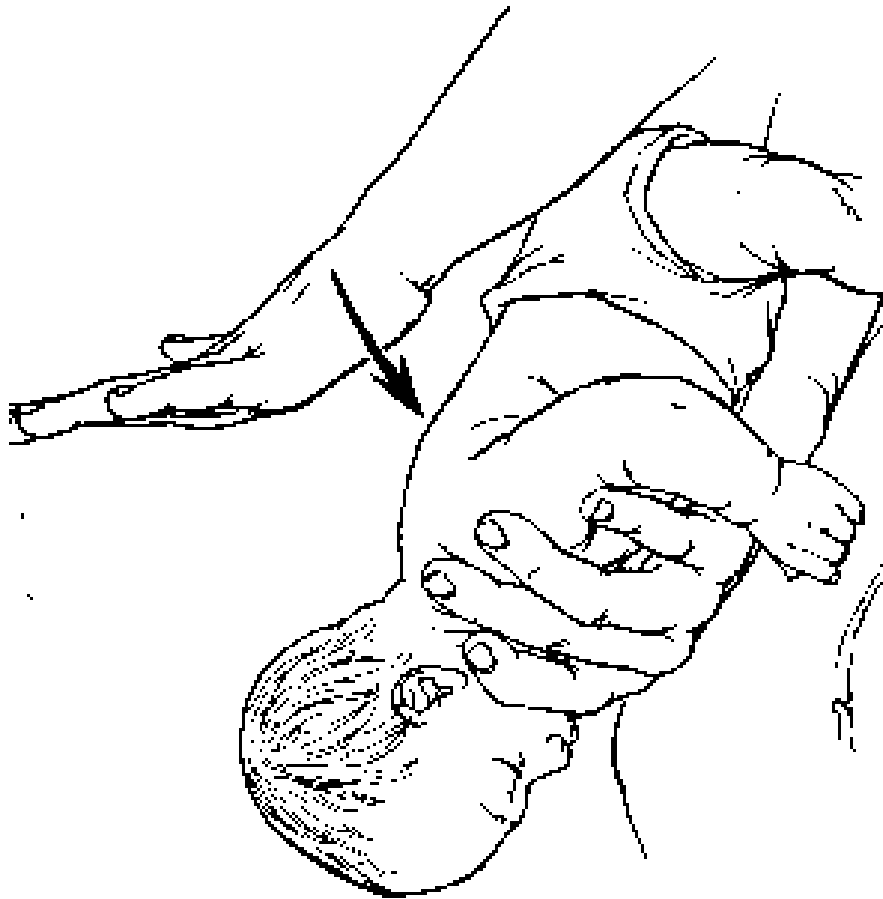
HEIMLICH MANEUVER

- ◉ Conscious Child Standing
- ◉ Conscious or Unconscious Child, Lying

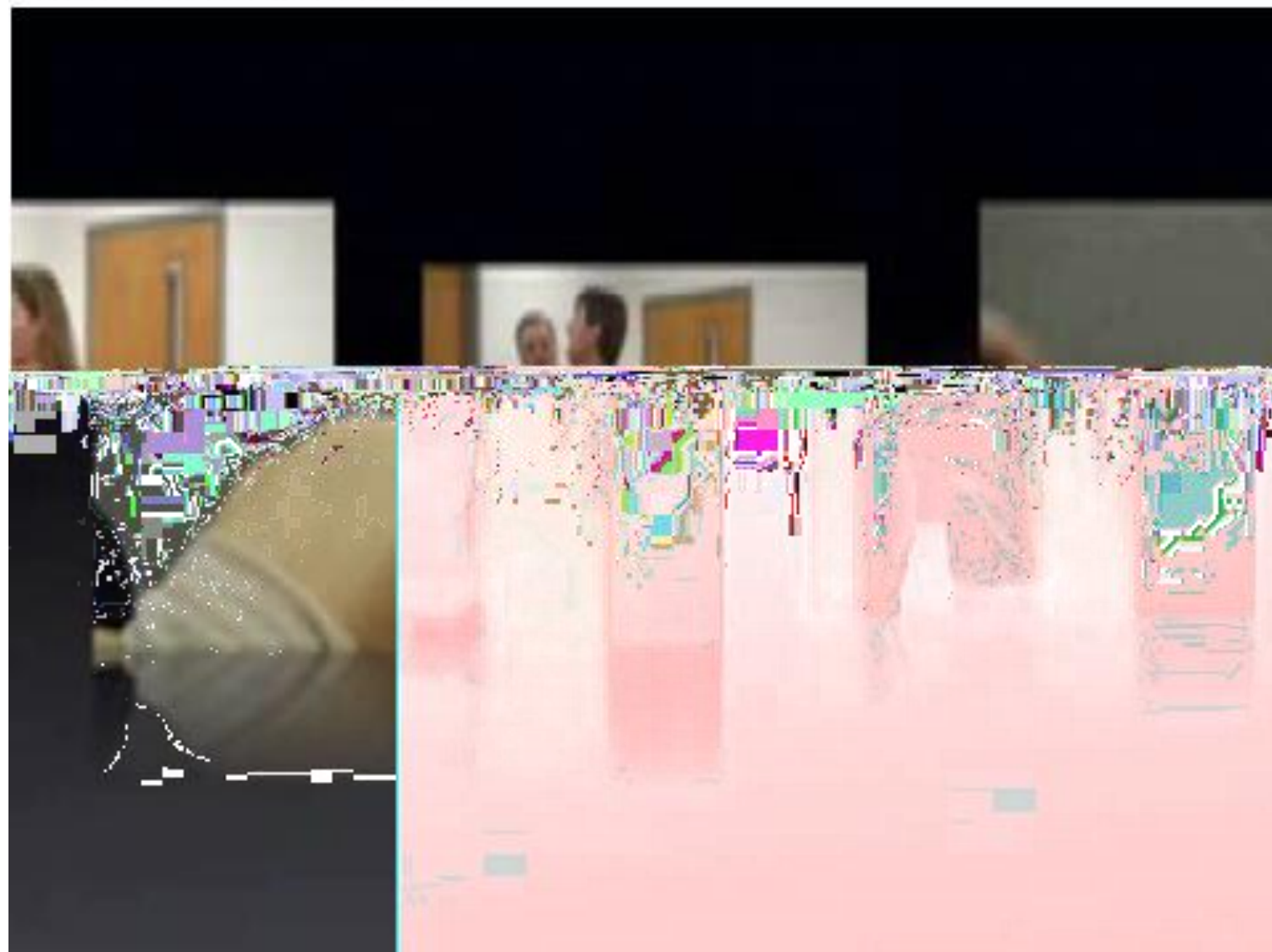




BACK BLOW & CHEST THRUST IN AN INFANT



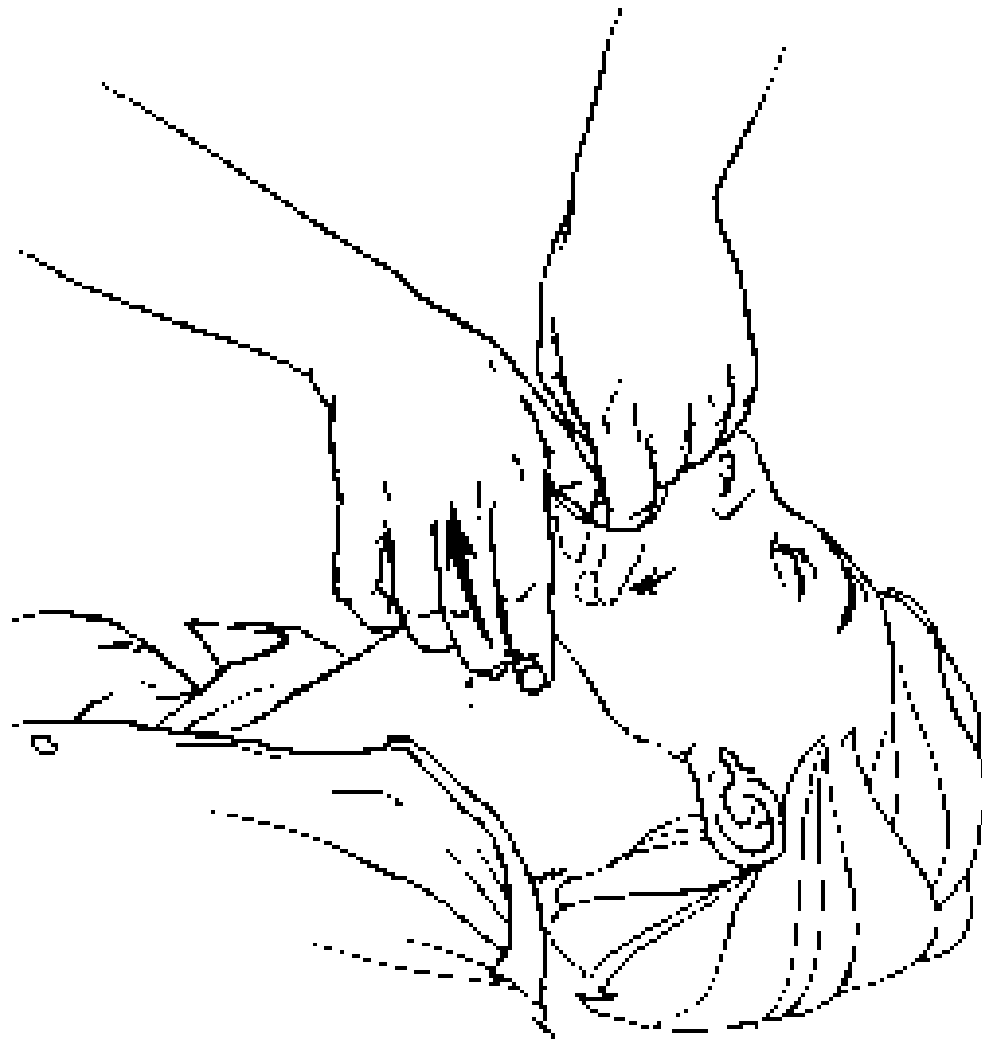
Heimlich maneuver



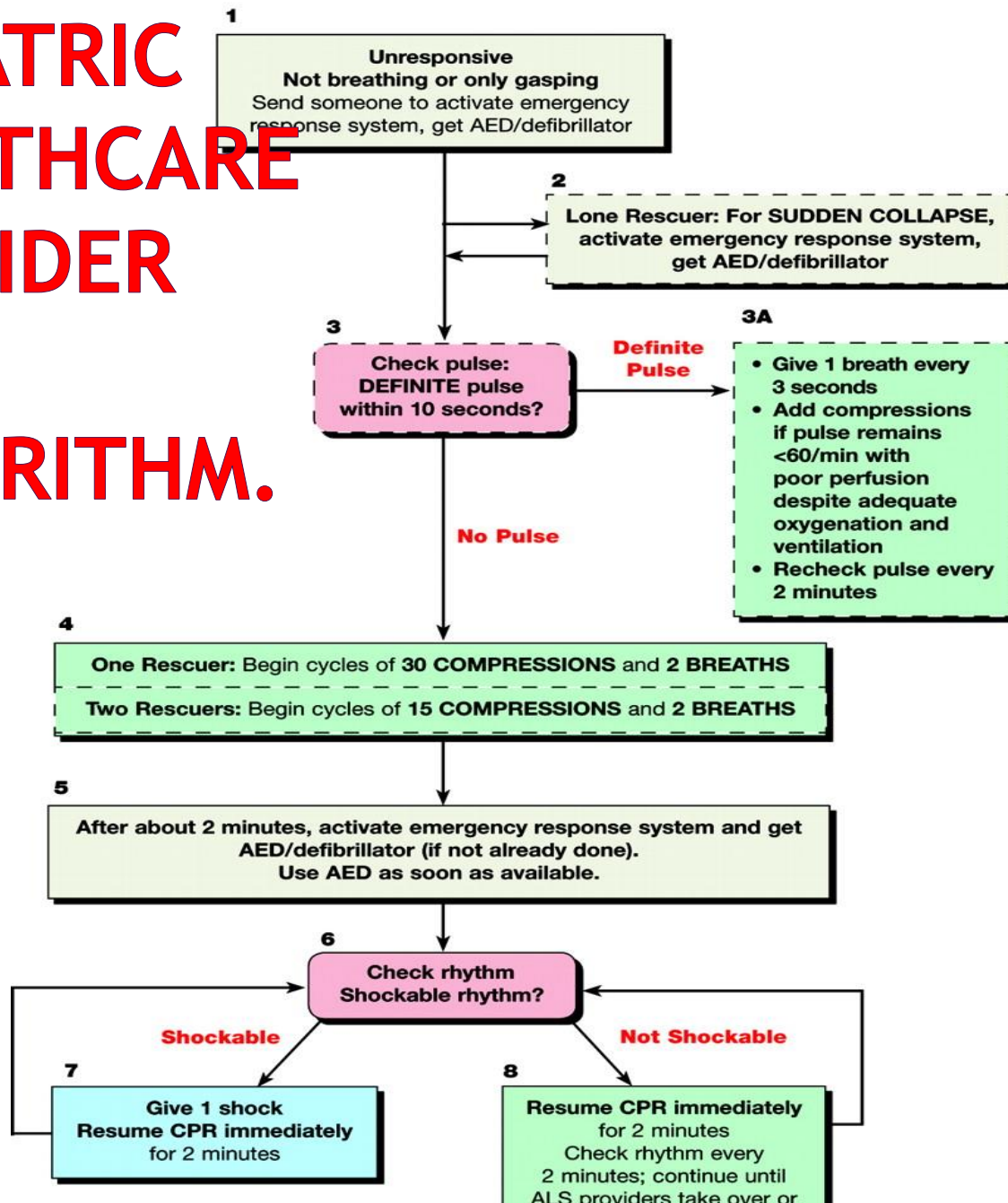
UNRESPONSIVE VICTIM

- Perform CPR but should look into the mouth before giving breaths.
 - If you see a foreign body, remove it.
 - Do not perform blind finger sweeps because it may push obstructing objects further into the pharynx & may damage the oropharynx.
 - Attempt to remove an object only if you can see it in the pharynx.
 - Then attempt ventilation & follow with chest compressions.

FINGER SWEEP MANEUVER ADMINISTERED TO AN UNCONSCIOUS VICTIM OF FBAO



PEDIATRIC HEALTHCARE PROVIDER BLS ALGORITHM.



High-Quality CPR

- Rate at least 100/min
- Compression depth to at least $\frac{1}{3}$ anterior-posterior diameter of chest, about 1½ inches (4 cm) in infants and 2 inches (5 cm) in children
- Allow complete chest recoil after each compression
- Minimize interruptions in chest compressions
- Avoid excessive ventilation

1

Unresponsive
Not breathing or only gasping
Send someone to activate emergency response system, get AED/defibrillator

2

Lone Rescuer: For SUDDEN COLLAPSE,
activate emergency response system,
get AED/defibrillator

3

Check pulse:
DEFINITE pulse
within 10 seconds?

**Definite
Pulse**

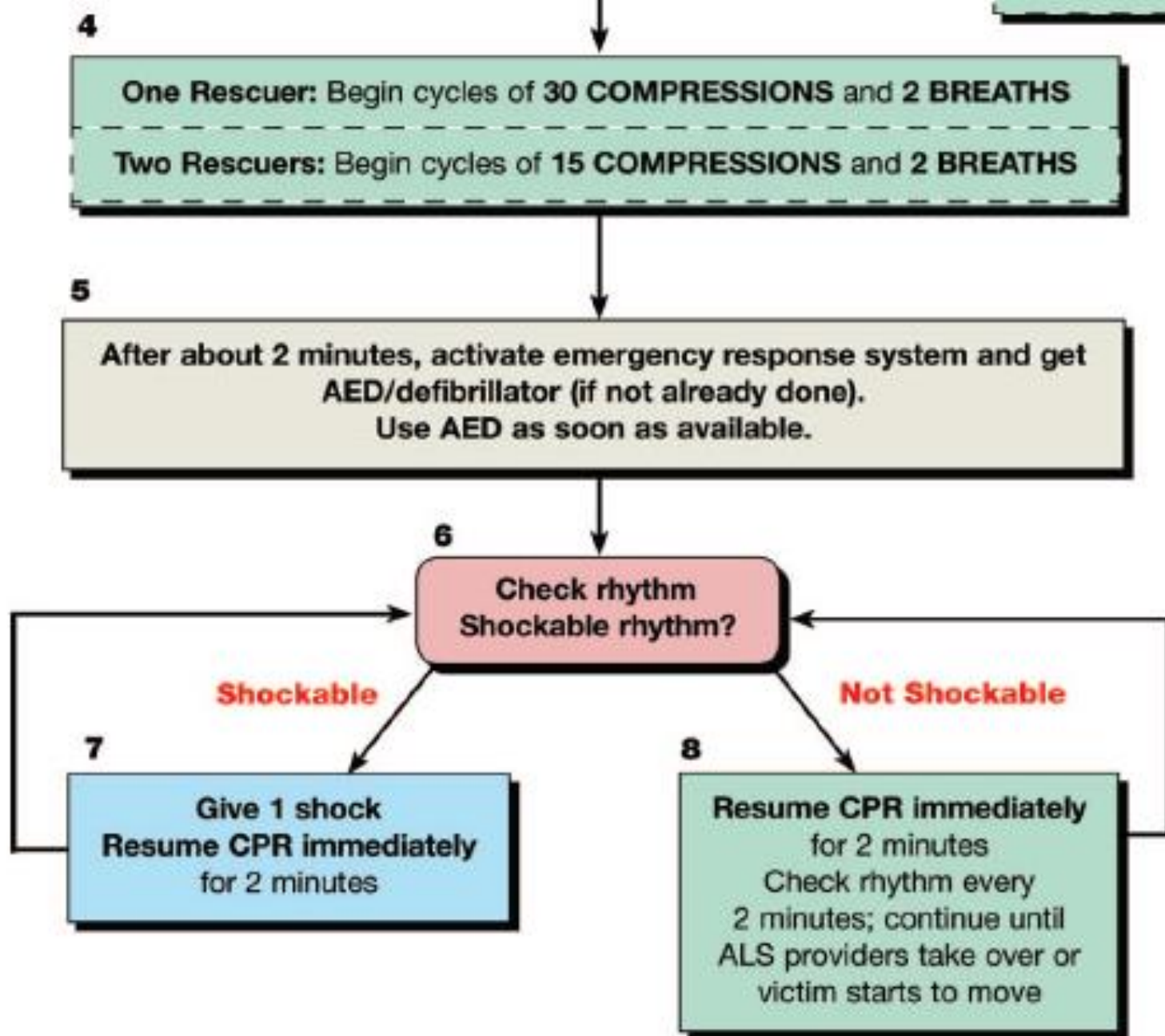
3A

- Give 1 breath every 3 seconds
- Add compressions if pulse remains <60/min with poor perfusion despite adequate oxygenation and ventilation
- Recheck pulse every 2 minutes

No Pulse

High-Quality CPR

- Rate at least 100/min
- Compression depth to at least $\frac{1}{3}$ anterior-posterior diameter of chest, about 1½ inches (4 cm) in infants and 2 inches (5 cm) in children
- Allow complete chest recoil after each compression
- Minimize interruptions in chest compressions
- Avoid excessive ventilation



Note: The boxes bordered with dashed lines are performed by healthcare providers and not by lay rescuers