PEDIATRIC BASIC LIFE SUPPORT

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American Heart Association.
Fighting Heart Disease and Stroke
Circulation
Journal of the American Heart Association

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

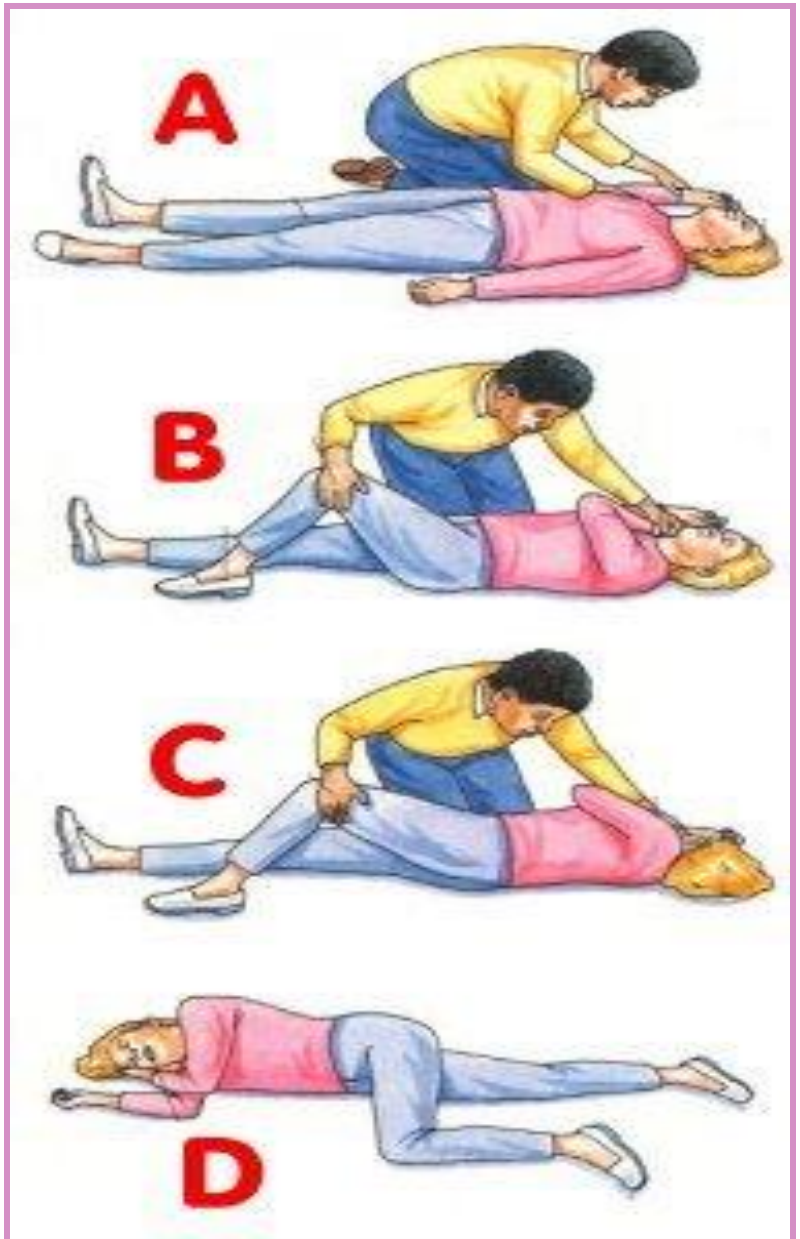
→

- 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 Gasping

- 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.

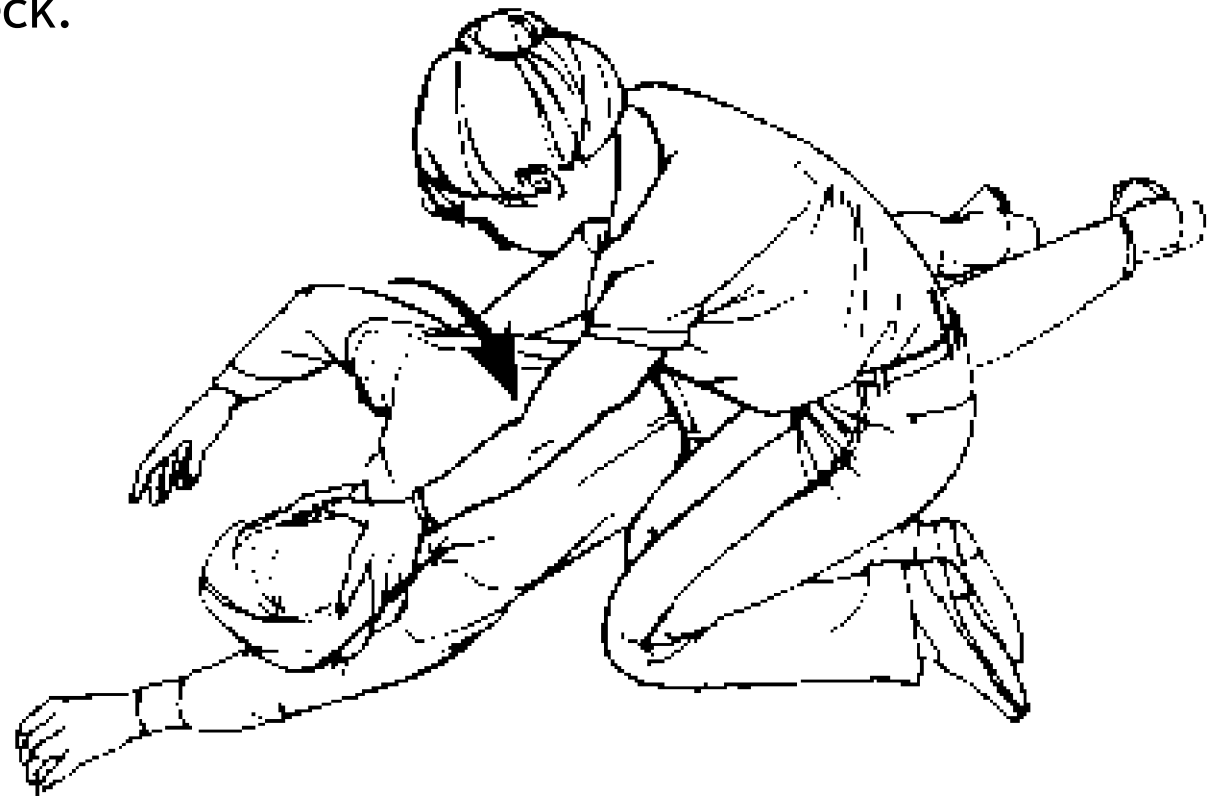
CARRYING A SMALL CHILD TO THE TELEPHONE

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

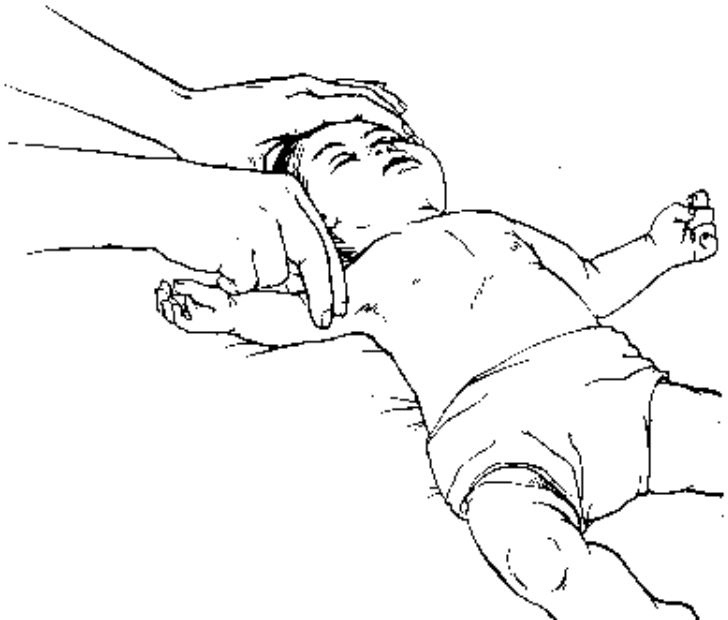
POSITION THE VICTIM

- 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

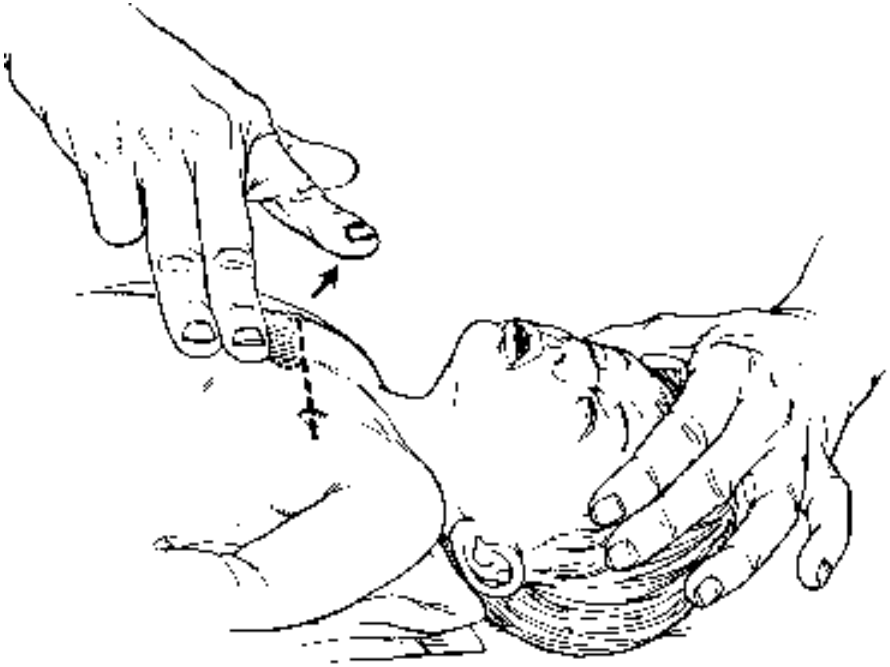
- Compress the lower half of the sternum.
- Do not compress over the xiphoid.
- After each compression allow the chest to recoil fully to improve blood flow into the heart.
- Lift your hand slightly off the chest at the end of each compression.

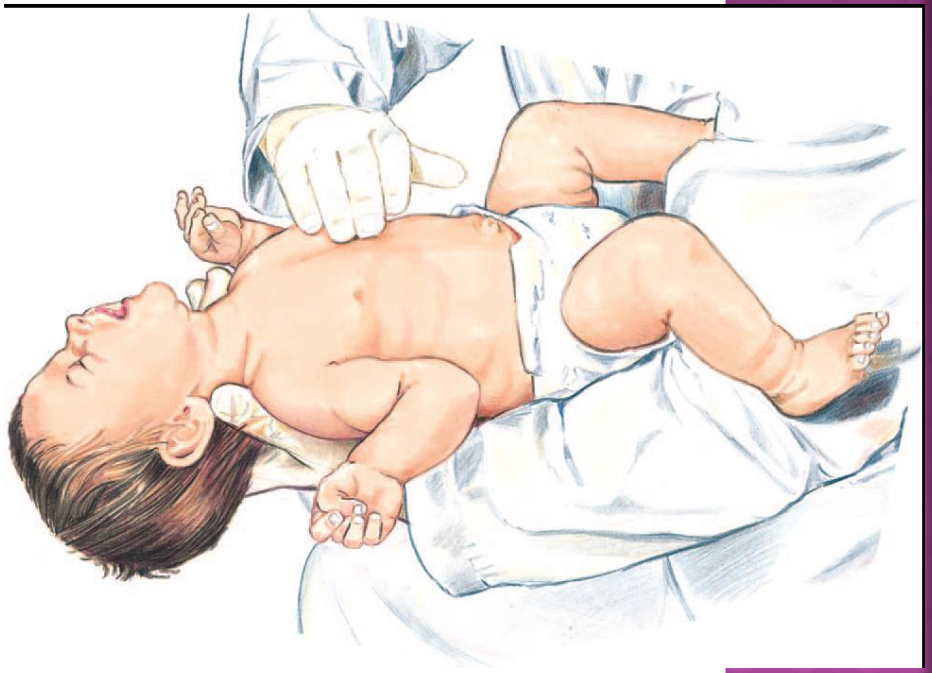
CHEST COMPRESSIONS

- *"Push hard": to depress the chest approximately 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

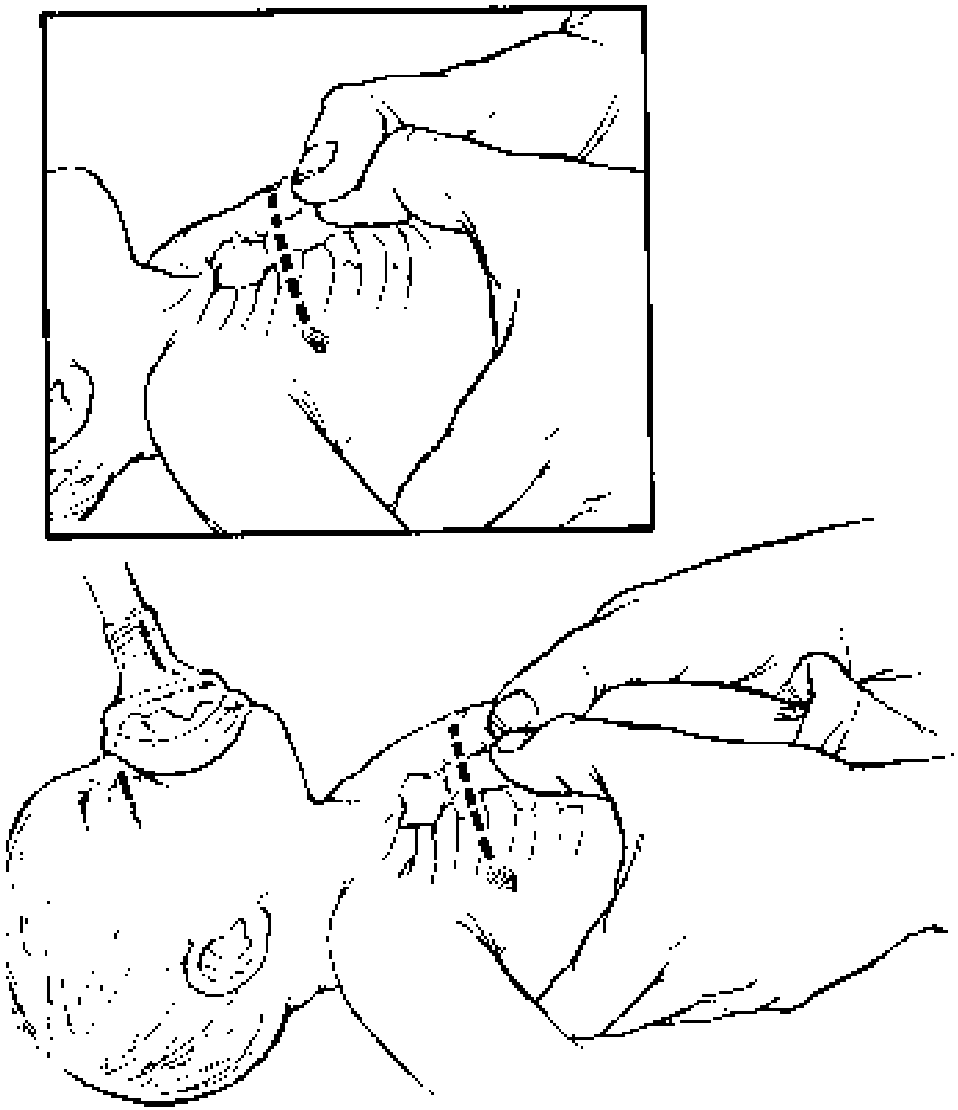
- For lay rescuers & lone rescuers
- Place 2 fingers just below the inter-mammary line.



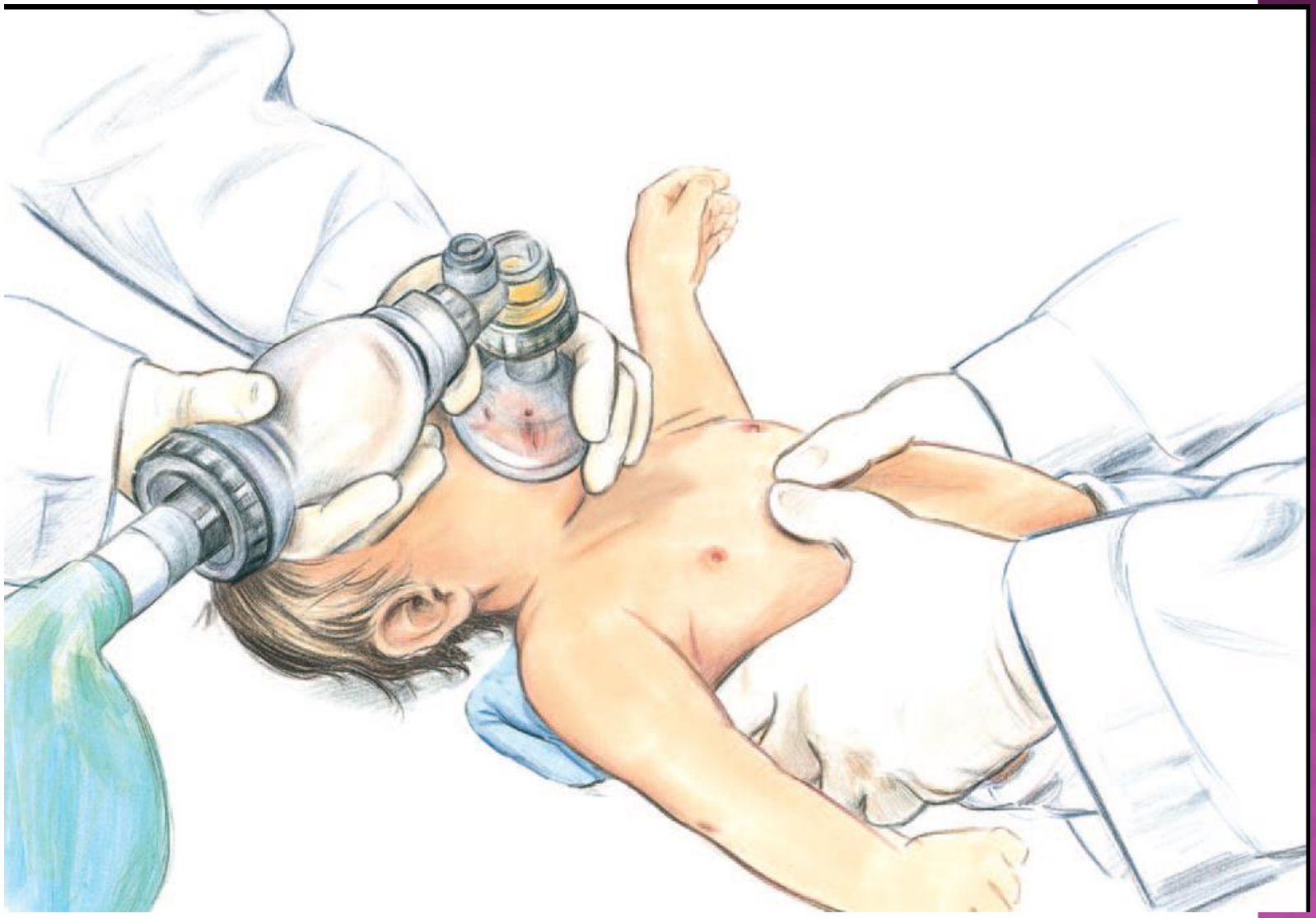


HAND POSITION FOR CHEST ENCIRCLEMENT

- 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 .

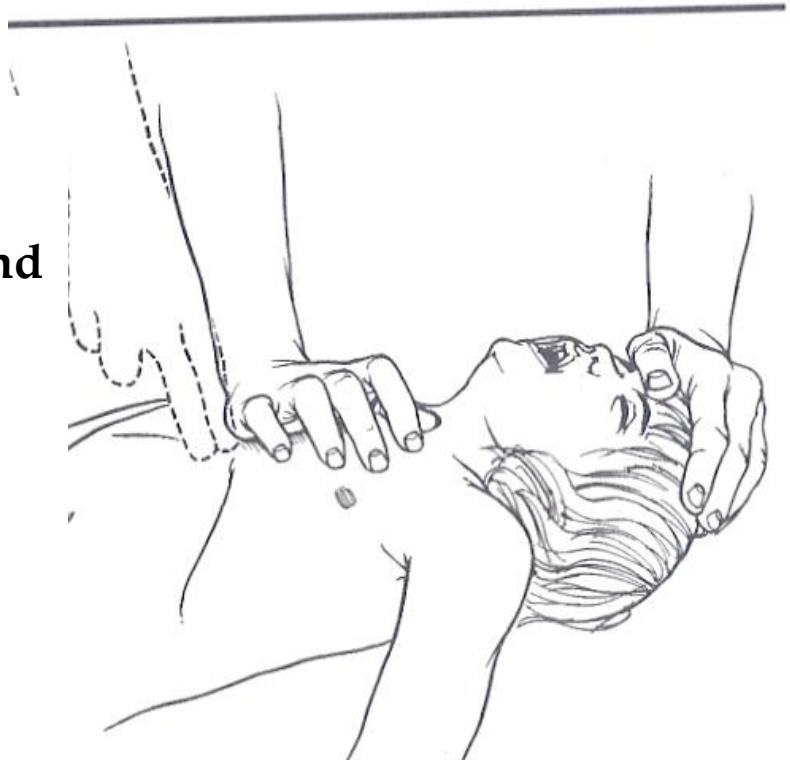


2 THUMB–ENCIRCLING HANDS CHEST COMPRESSION IN INFANT (2 RESCUERS)

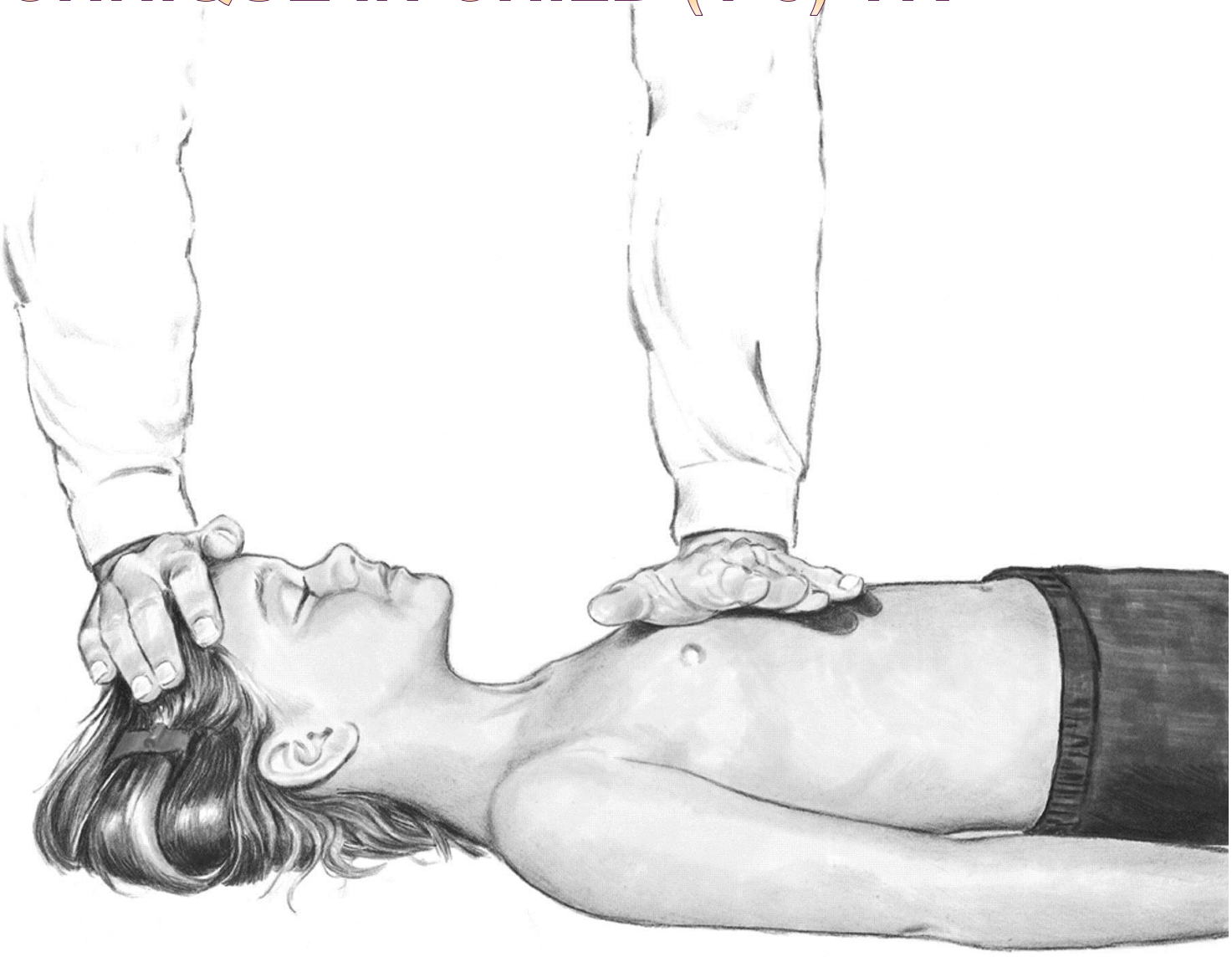


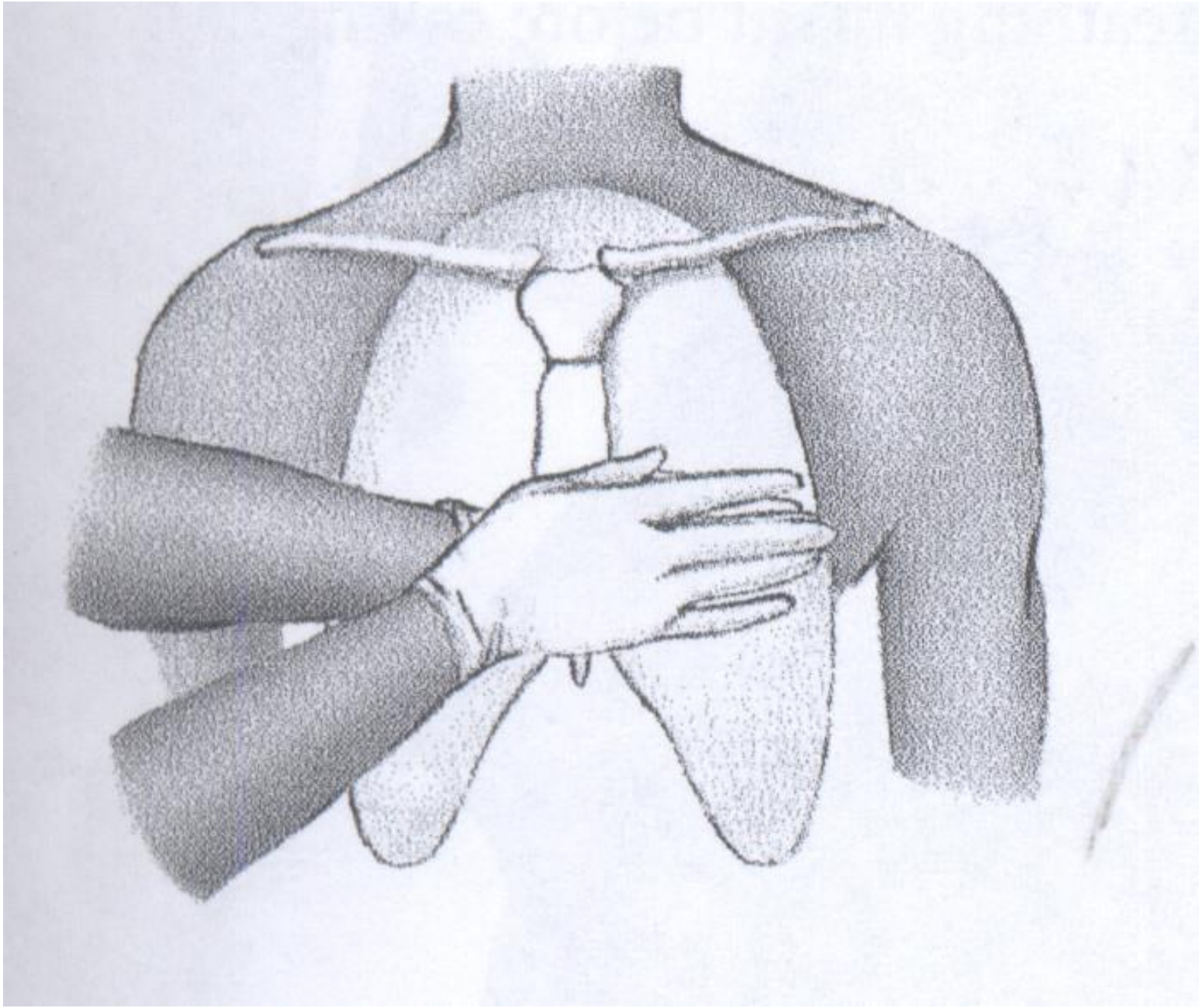
CHEST COMPRESSIONS

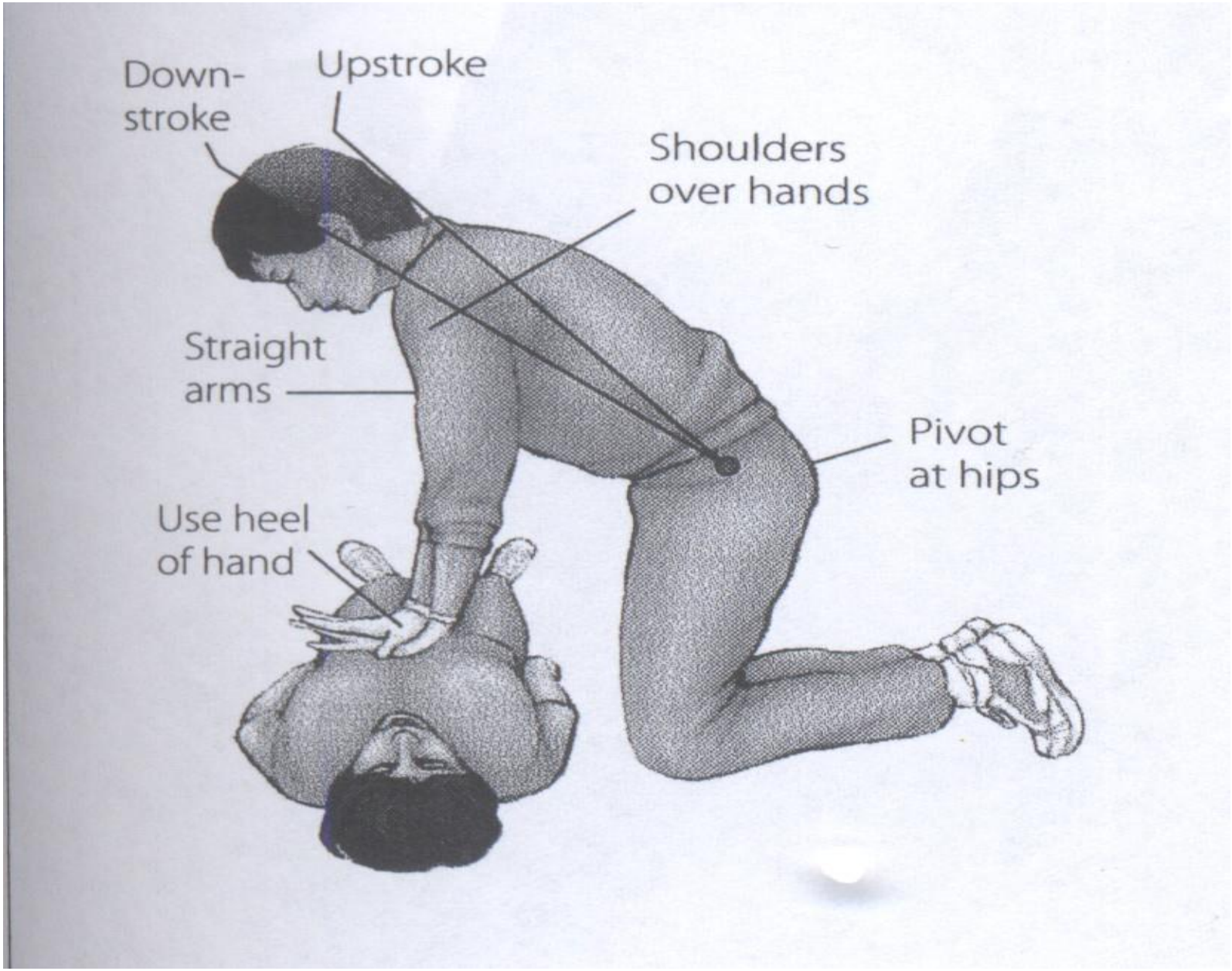
- In older children → the lower third of the sternum
- Maintain continuous head tilt with hand on forehead
- One hand
- 100/minute
- 1/3 of chest



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



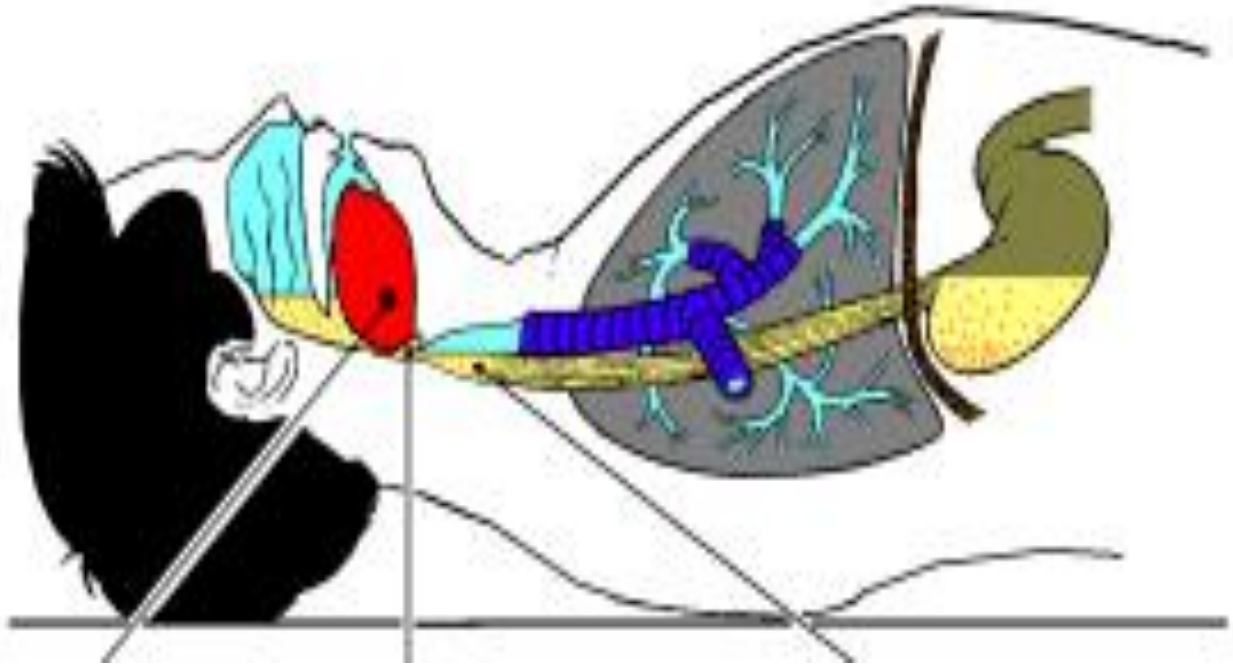



Down-
stroke
Upstroke
Shoulders
over hands
Straight
arms
Pivot
at hips
Use heel
of hand

VENTILATIONS
INADEQUATE BREATHING WITH PULSE

- After 30 compressions (15 compressions if 2 rescuers),open the airway with a head tilt- chin lift and give 2breaths. 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



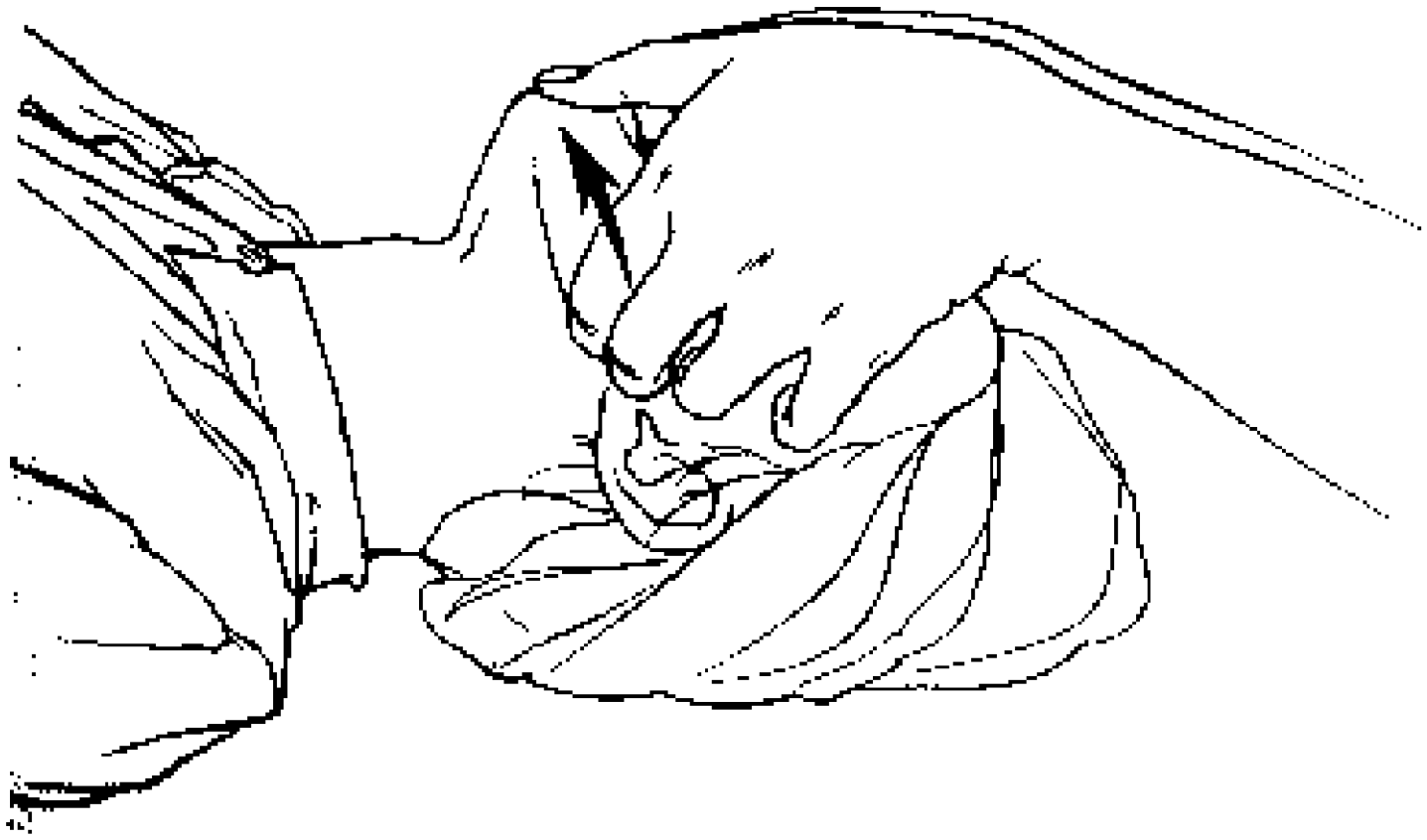
CERVICAL SPINAL PRECAUTIONS

- 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

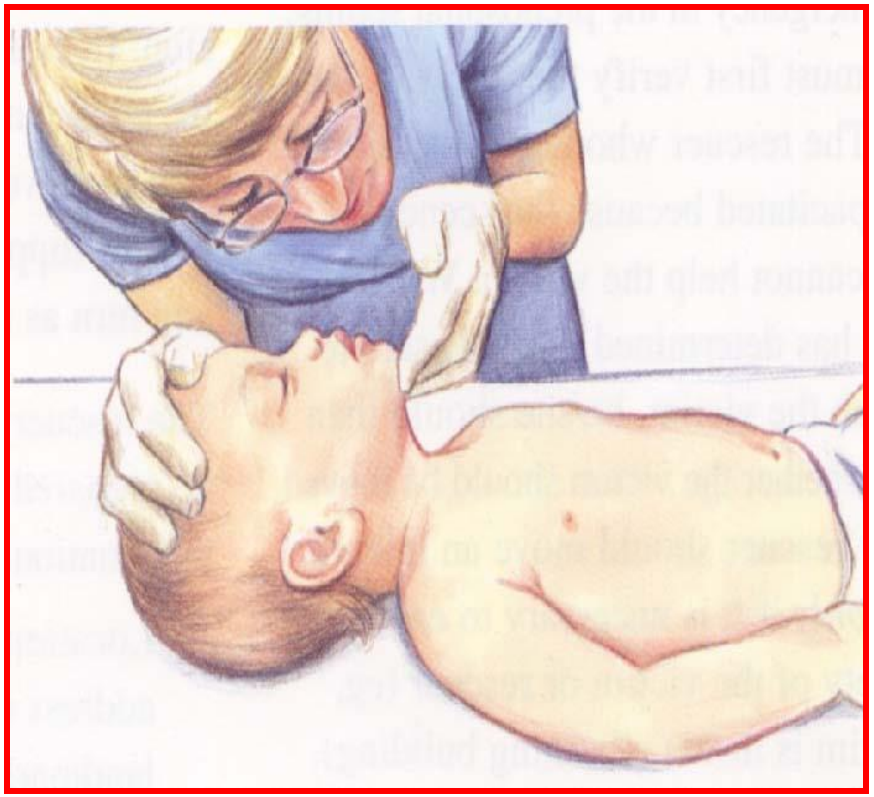
- Airway obstruction produced by the tongue & the epiglottis
- Relief by head-tilt/chin-lift

JAW-THRUST MANEUVER

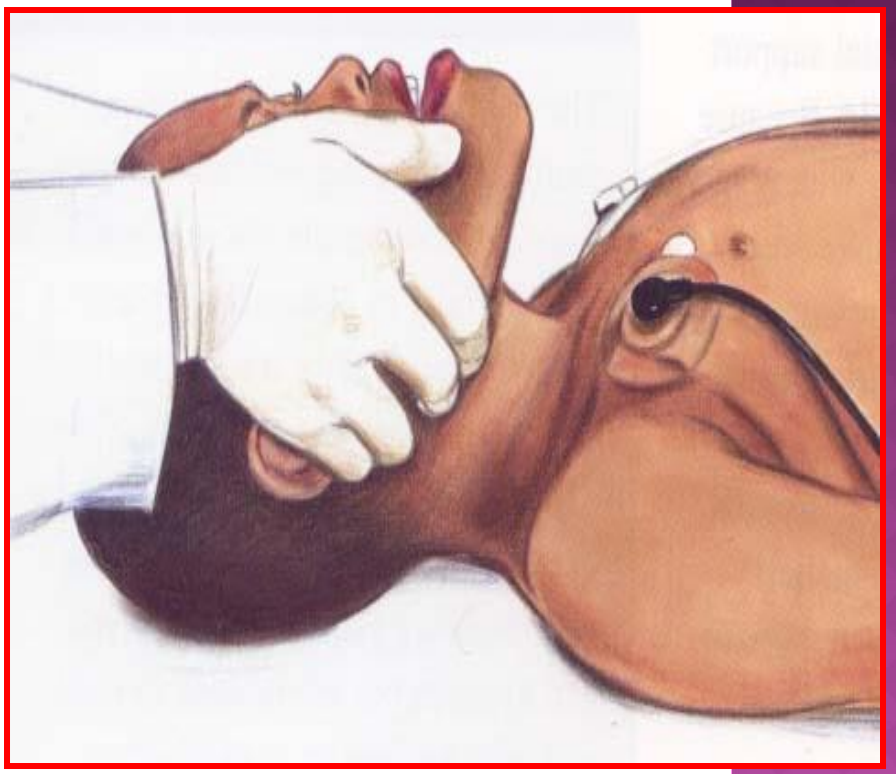


AIRWAY MANAGEMENT

Head Tilt-Chin Lift

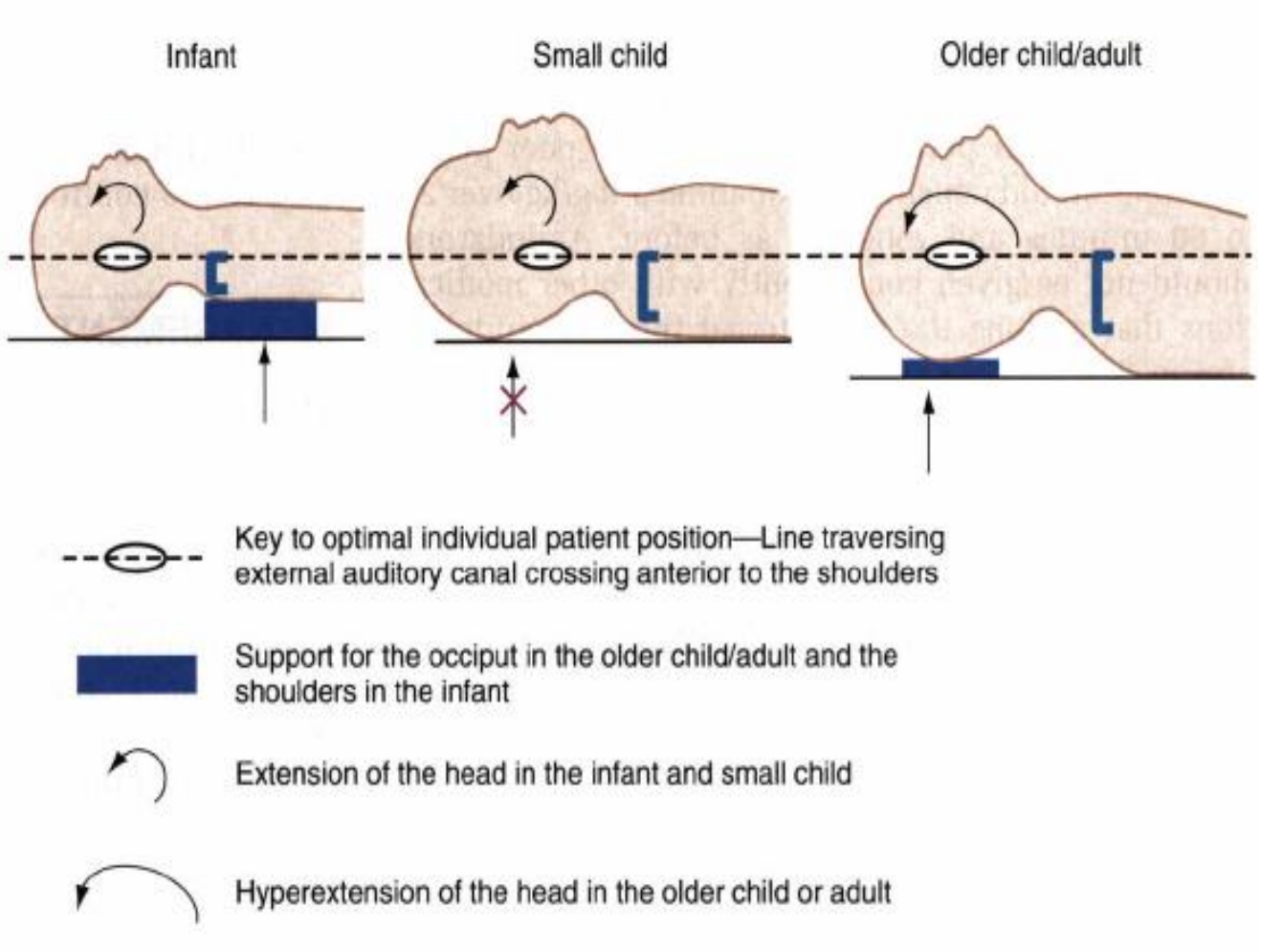


Jaw Thrust



Avoid extreme hyperextension

CORRECT (SNIFFING) POSITION FOR MAXIMAL AIRWAY PATENCY



RESCUE BREATHING

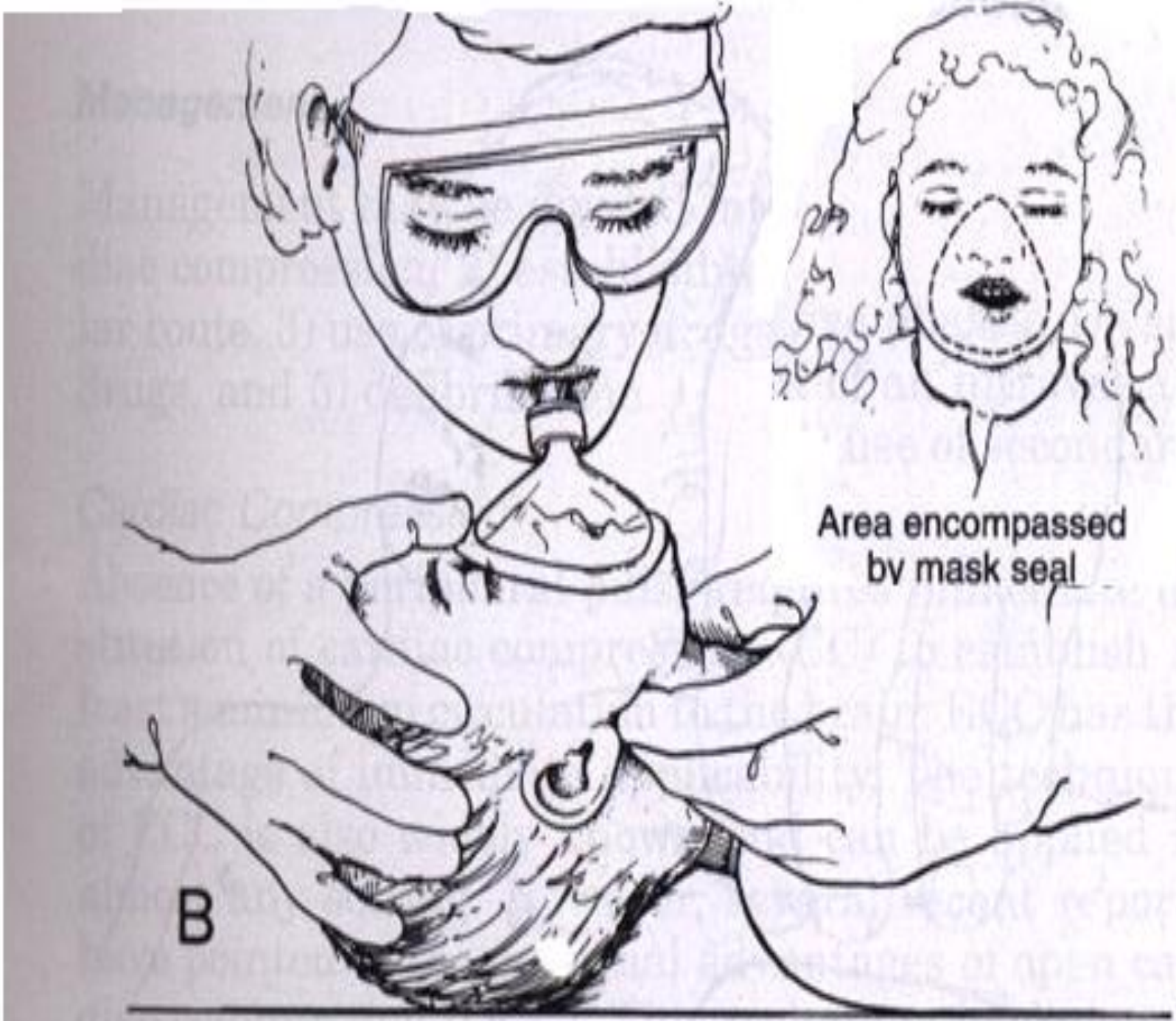
- Maintain an open airway & give 2 breaths.
  - Make sure that the breaths are effective (i.e., the chest rises).
  - If the chest does not rise, reposition the head, make a better seal, & try again.

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

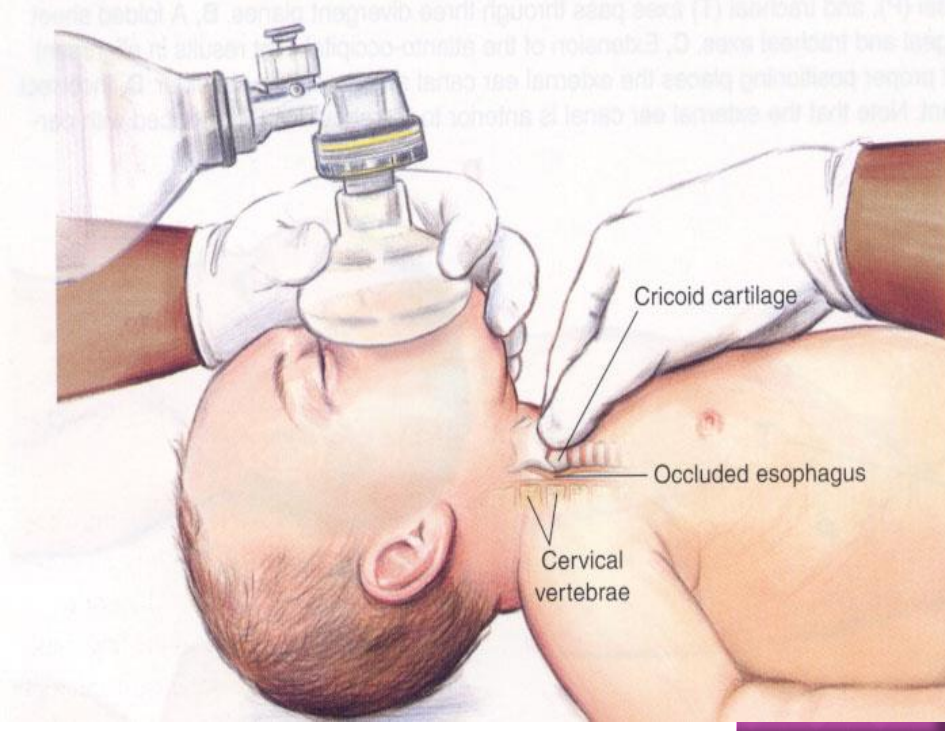
- Despite its safety, some healthcare providers & lay rescuers may hesitate to give mouth-to-mouth rescue breathing & prefer to use a barrier device.
- Barrier devices have not reduced the risk of transmission of infection, & some may increase resistance to air flow.
- If you use a barrier device, do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


Area encompassed
by mask seal
B

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

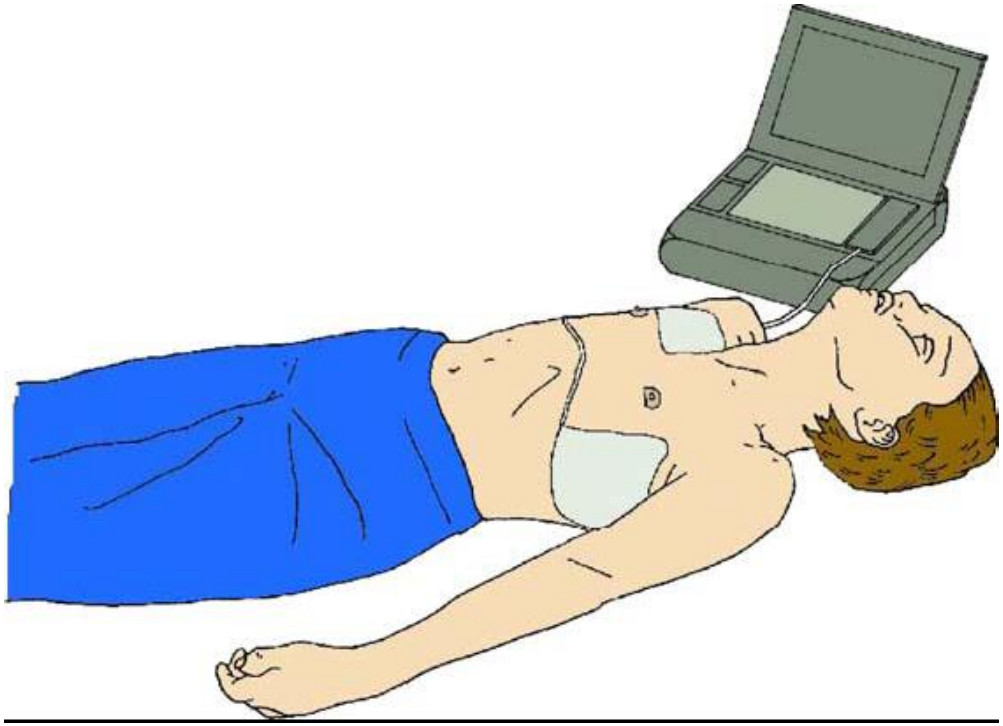
- A lone rescuer uses a compression-to-ventilation ratio of 30:2.
- For 2-rescuer infant and child CPR, one provider should perform chest compressions while the other keeps the airway open and performs ventilations at a ratio of 15:2
- Deliver ventilations with minimal interruptions in chest compressions

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.

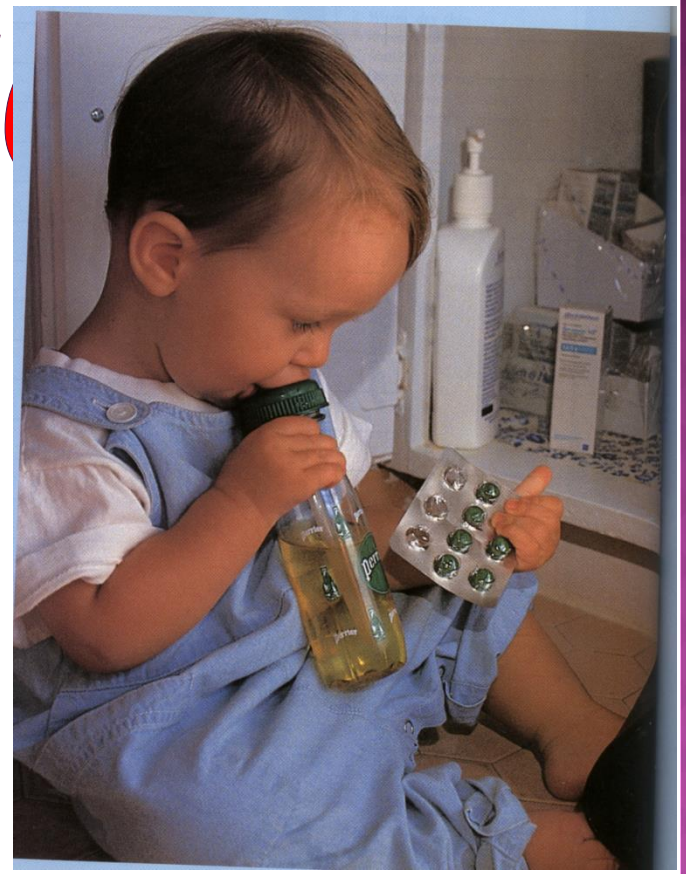
DEFIBRILLATION

- 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

CHOCKIN



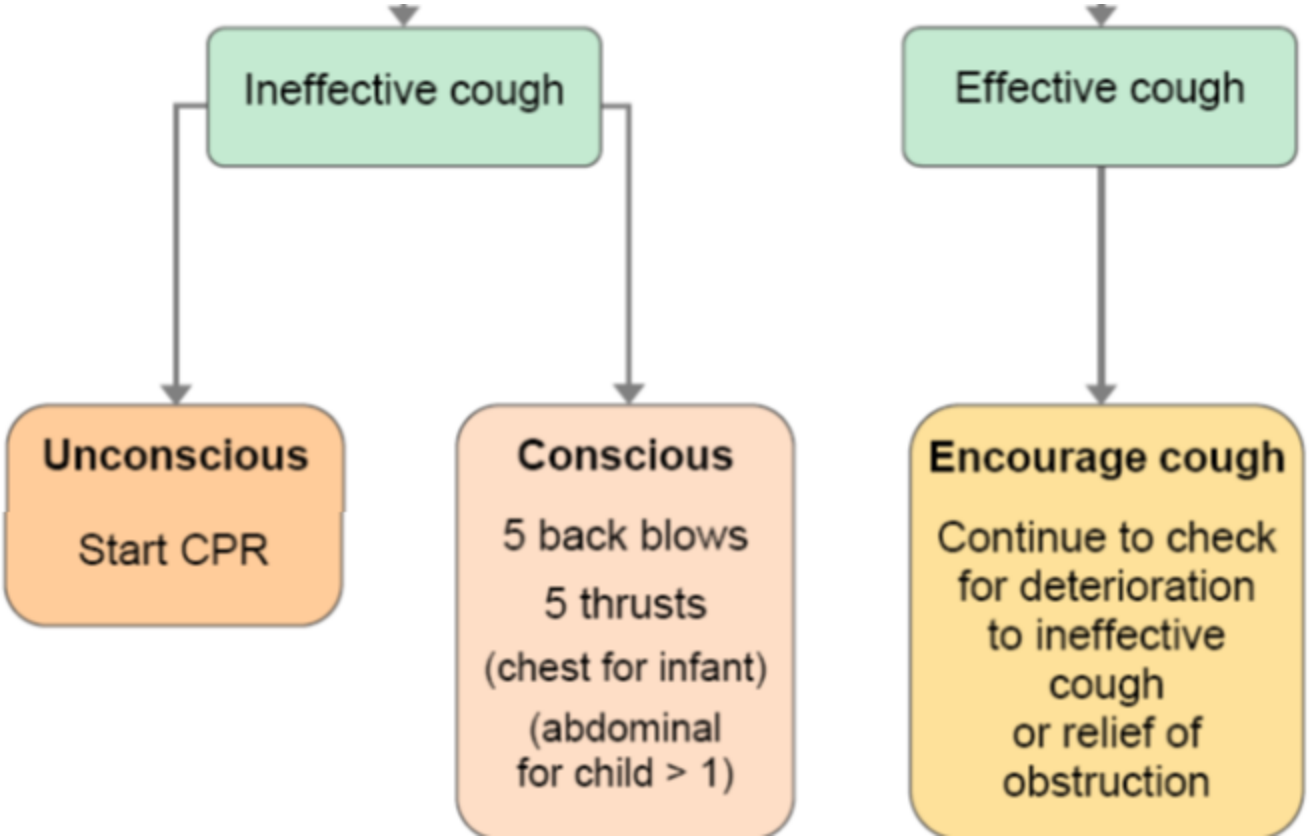
FBAO (CHOKING)

- **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.

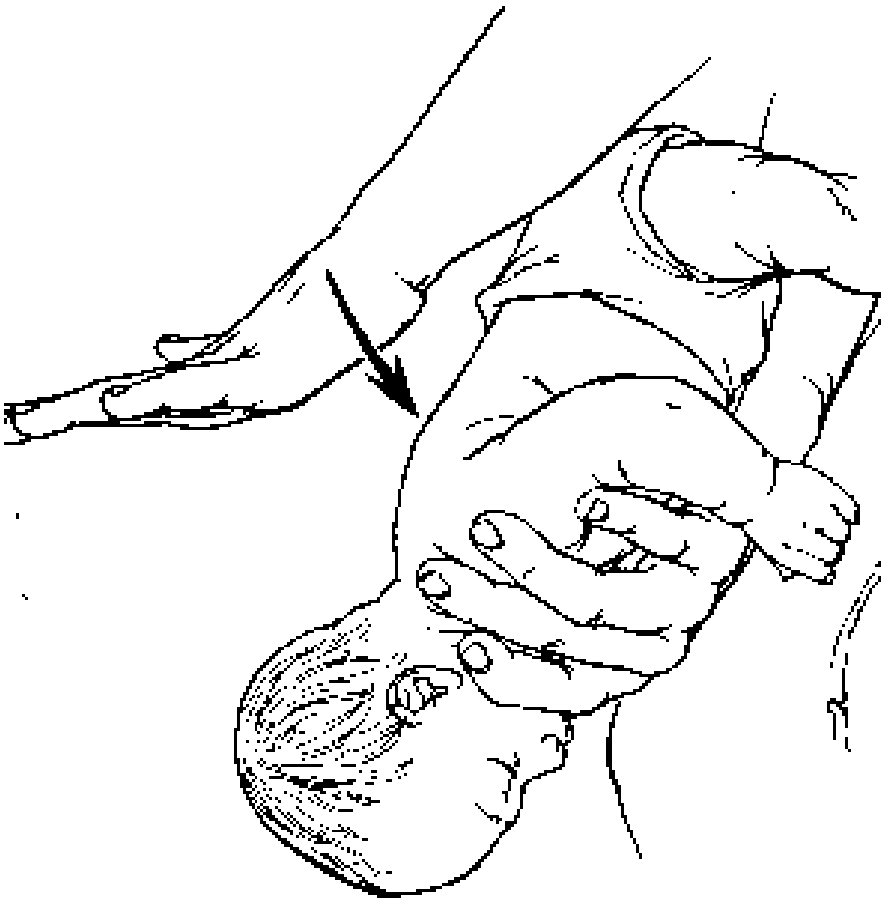


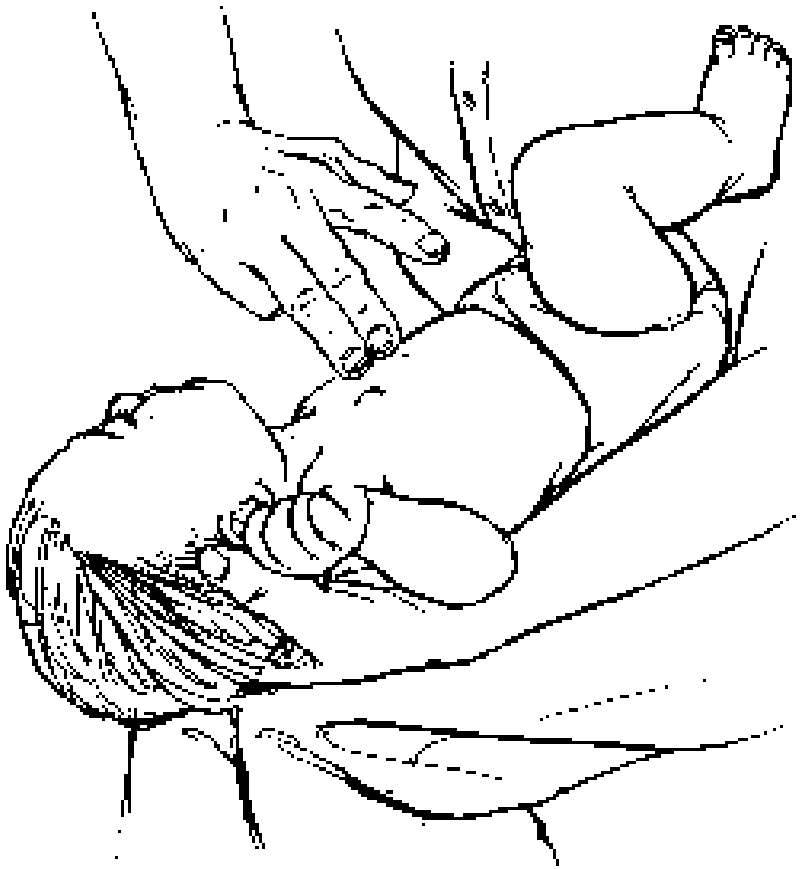
HEIMLICH MANEUVER

- Conscious Child Standing

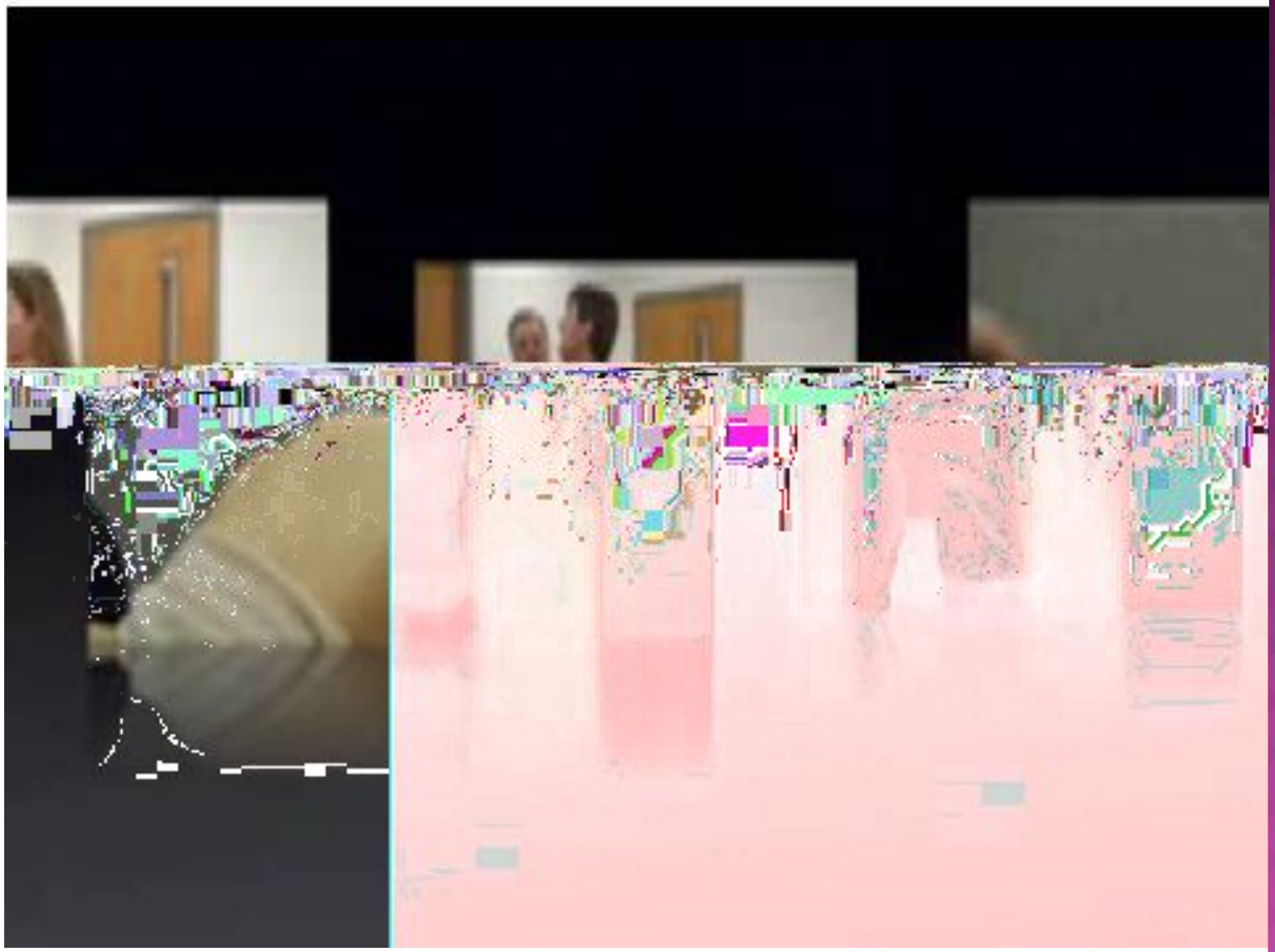
- Conscious or Unconscious Child, Lying

BACK BLOW & CHEST THRUST IN AN INFANT





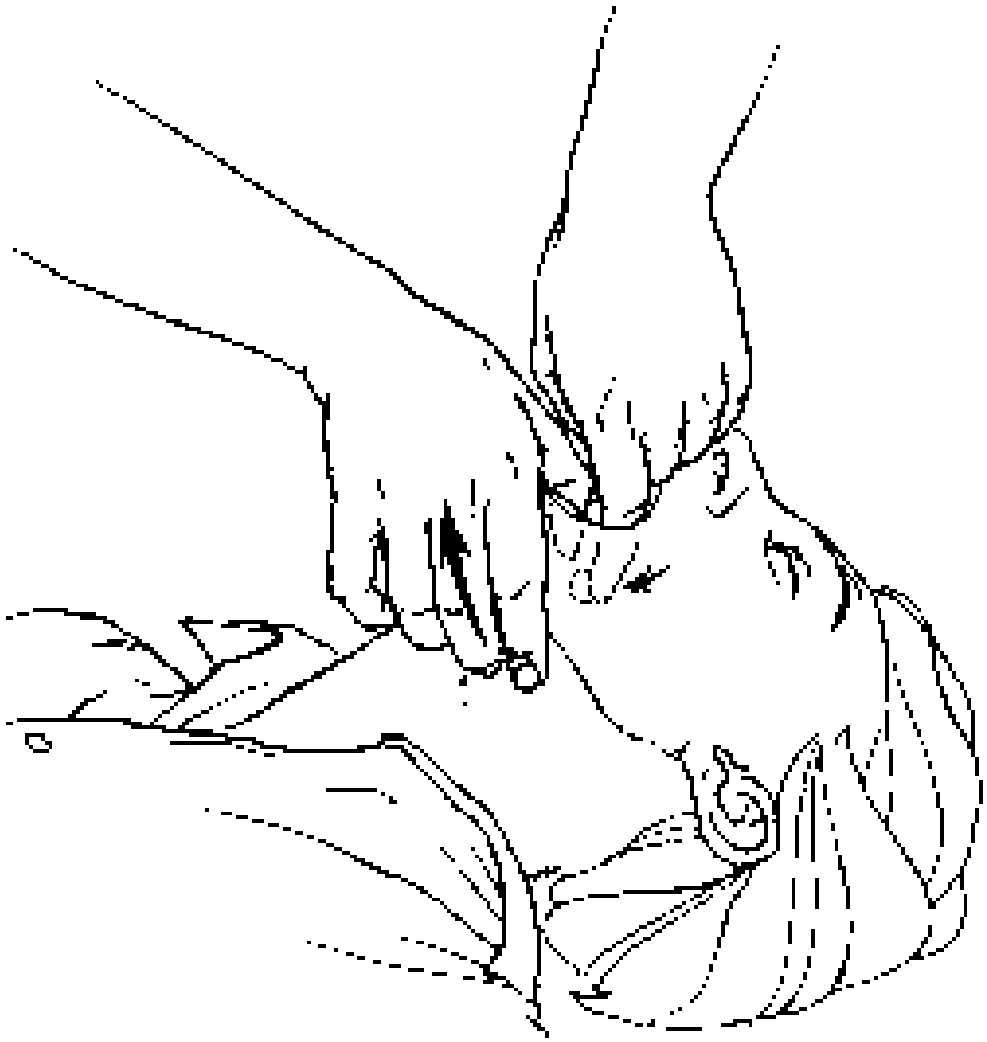
Heimlich maneuver



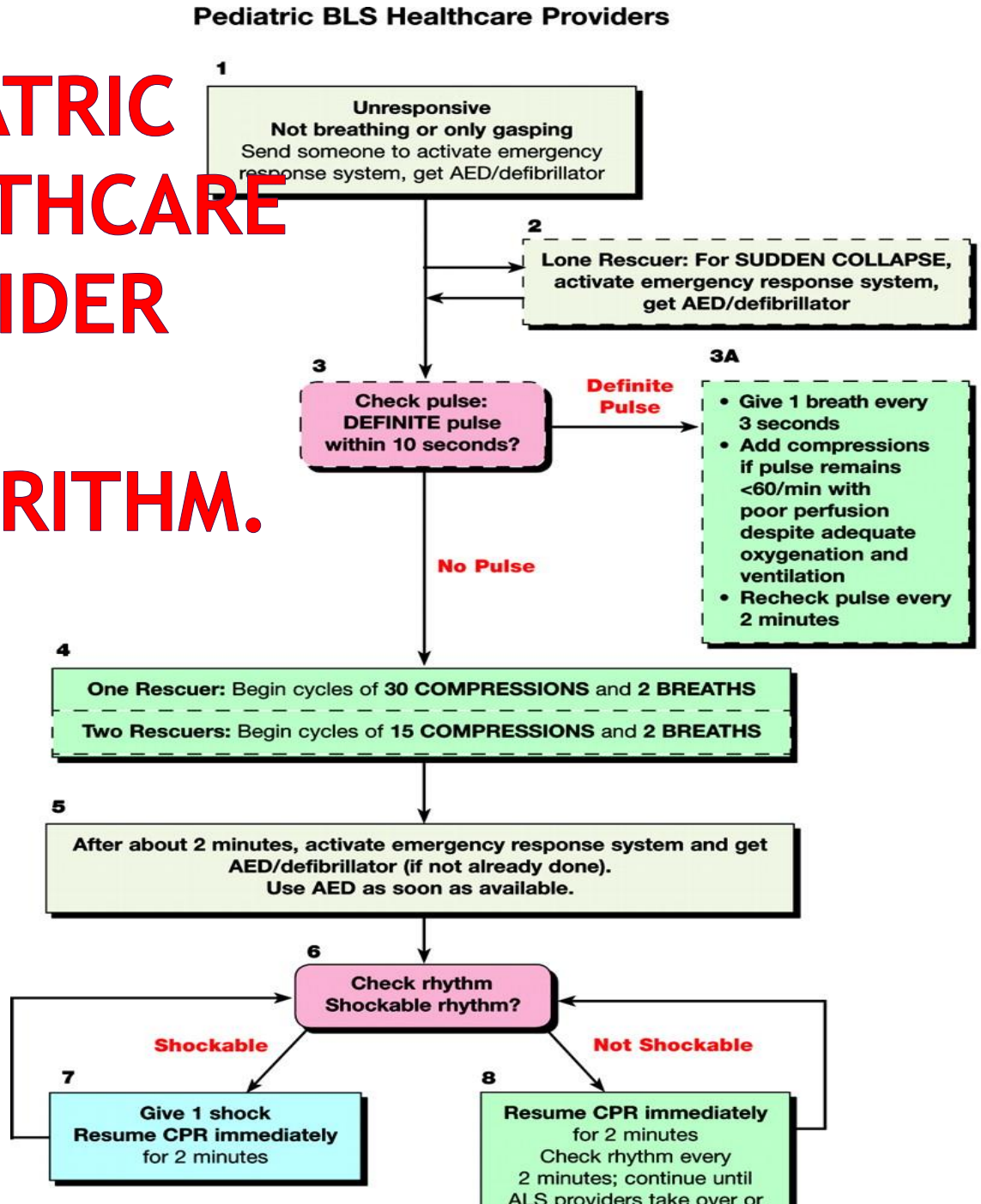
UNRESPONSIVE VICTIM

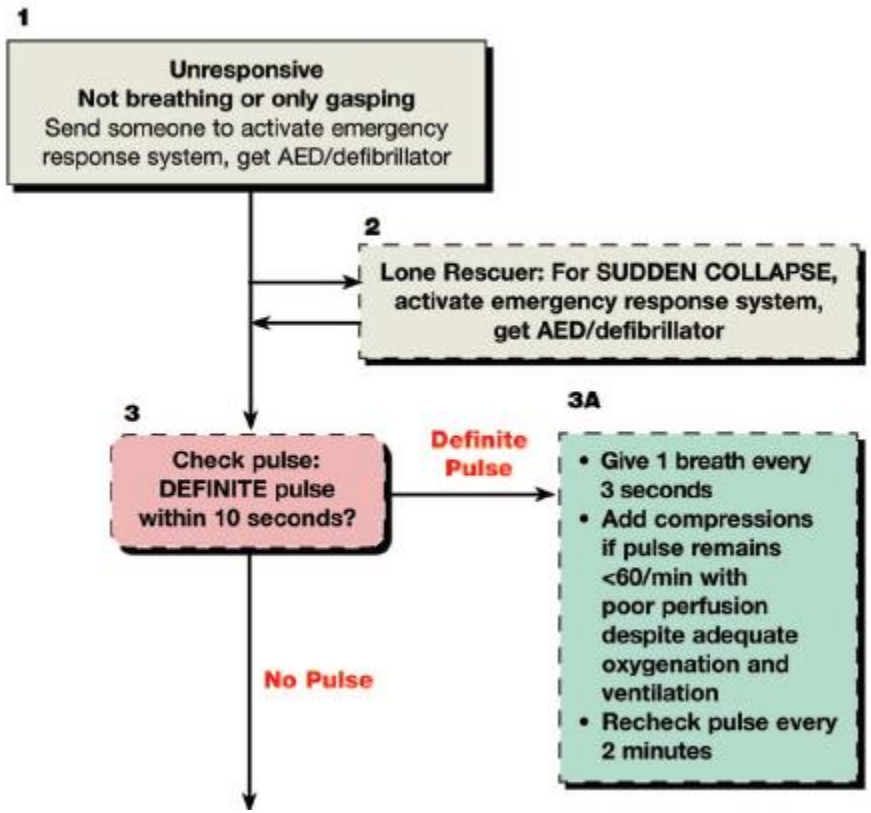
- Perform CPR but should look into the mouth before giving breaths.
  - If you see a foreign body, remove it.
  - Do not perform blind finger sweeps because it may push obstructing objects further into the pharynx & may damage the oropharynx.
  - Attempt to remove an object only if you can see it in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

FINGER SWEEP MANEUVER ADMINISTERED TO AN UNCONSCIOUS VICTIM OF FBAO



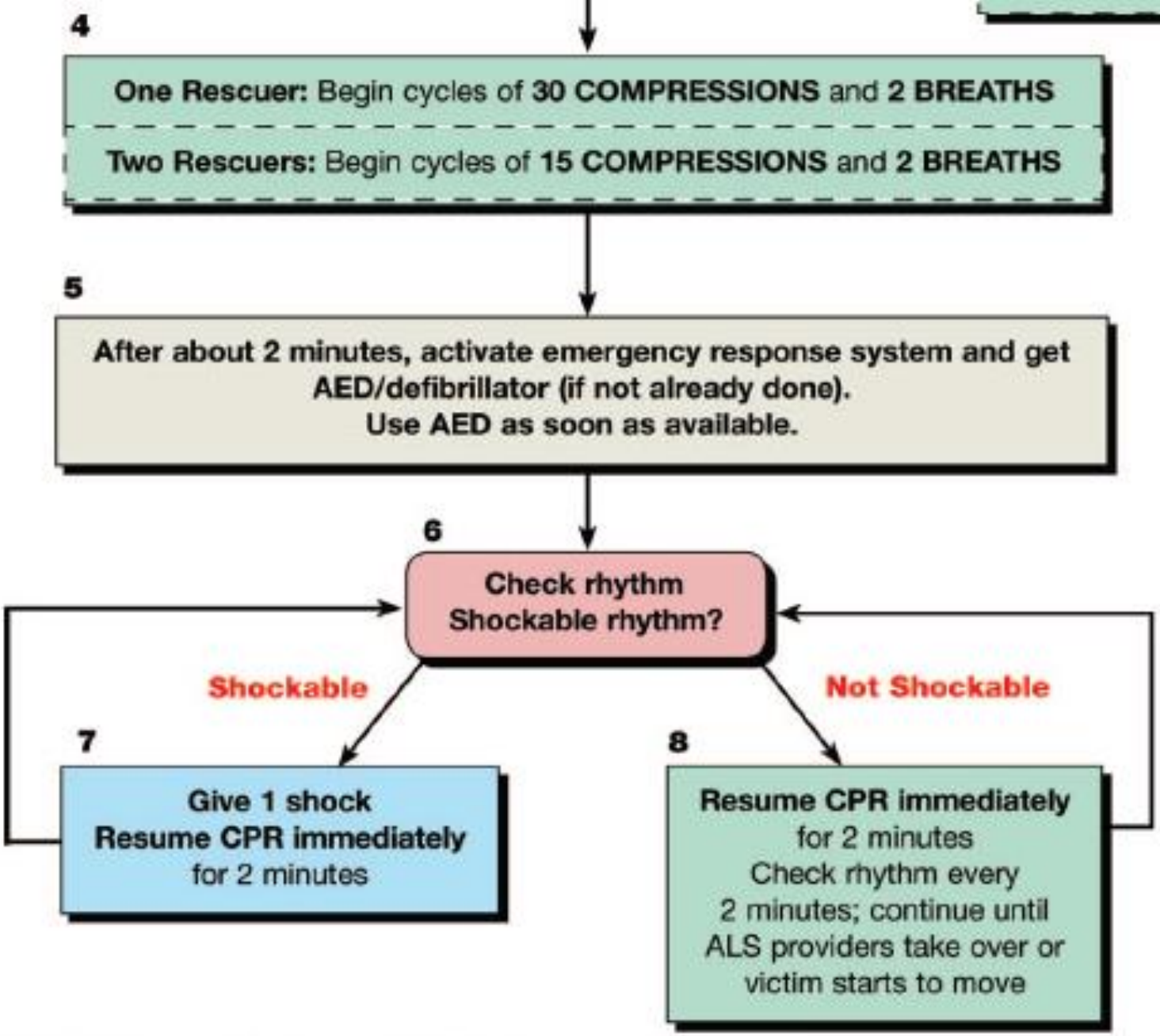
PEDIATRIC HEALTHCARE PROVIDER BLS ALGORITHM.





High-Quality CPR

- Rate at least 100/min
- Compression depth to at least ⅓ 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