ON FIELD MANAGEMENT OF EMERGENCIES IN SPORTS

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INTRODUCTION

- As we all know that in todays world sports events have taken a center stage for promoting harmony, social development & prosperity.

- As sports are getting more competitive we are witnessing more injuries on the field as well ….which can range from a simple blunt trauma (abrasion) to catastrophe events like concussion/ sudden cardiac death

- So nowadays special emphasis is now given on providing medical care & regular training of medical personnel is done to handle emergencies on field.

COLLAPSED ATHLETE ON FIELD

NEED…

- Every sports physician should be thoroughly trained about common medical emergencies encountered on the field.

- **A good knowledge about emergency medicine & an active response plan can save patients' life.**

- **Not only the doctor but entire support staff /medical team must be well versed with basics of emergency medicine esp. CPR.**

EVENT SEQUENCE FOR EMERGENCY CARE

- PREPARATION
- TRIAGE
- PRIMARY SURVEY
- RESUSCITATE & STABILISE
- FOCUSED HISTORY
- SECONDARY SURVEY
- RE ASSESSMENT
- DEFINITIVE CARE

PREPARATION

PRE SITUATION

- Emergency medical knowledge
- Emergency medical skills
- Emergency medical equipment
- Clinical team rehearsal
- Ensuring clinical team, athletes & officials are aware of emergency response procedures, exit points at venues where they train/participate

SITUATION

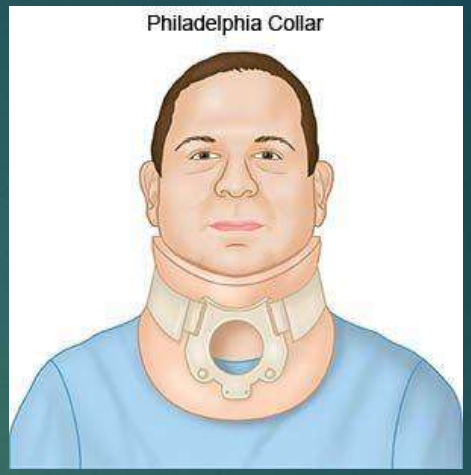
- Survey scene safety
- Ensure all medical team members adopt universal precautions
- Organize the clinical team

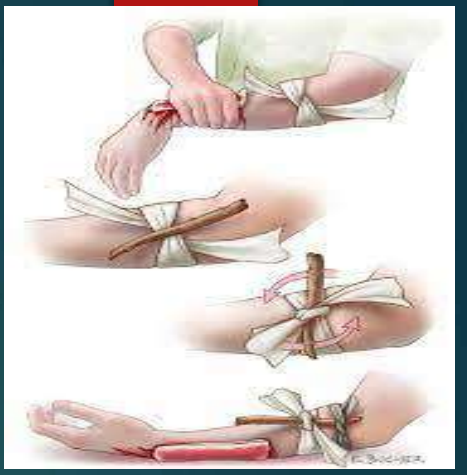
TRIAGE

- Sorting out patients based upon seriousness of injury suffered.
- As per nature of injury priority treatment can be started & marking done with color codes.
- RED color marked people are to be given the highest priority

Priority Group			Description
Number	Name	Color	
P1	Emergency/Immediate	Red	Patients who have life-threatening injuries that are treatable with a minimum amount of time, personnel, and supplies. These patients also have a good chance of recovery.
P2	Urgent	Yellow	Indicates that treatment may be delayed for a limited period of time without significant mortality or in the ICU setting patients for whom life support may or may not change their outcome given the severity of their illness.
P3	Delayed	Green	Patients with minor injuries whose treatment may be delayed until the patients in the other categories have been dealt with or patients who do not require ICU admission for the provision of life support.
P4	Expectant	Blue	Patients who have injuries requiring extensive treatment that exceeds the medical resources available in the situation or for whom life support is considered futile.
--	Dead	Black	Patients who are in cardiac arrest and for which resuscitation efforts are not going to be provided.

PRIMARY SURVEY





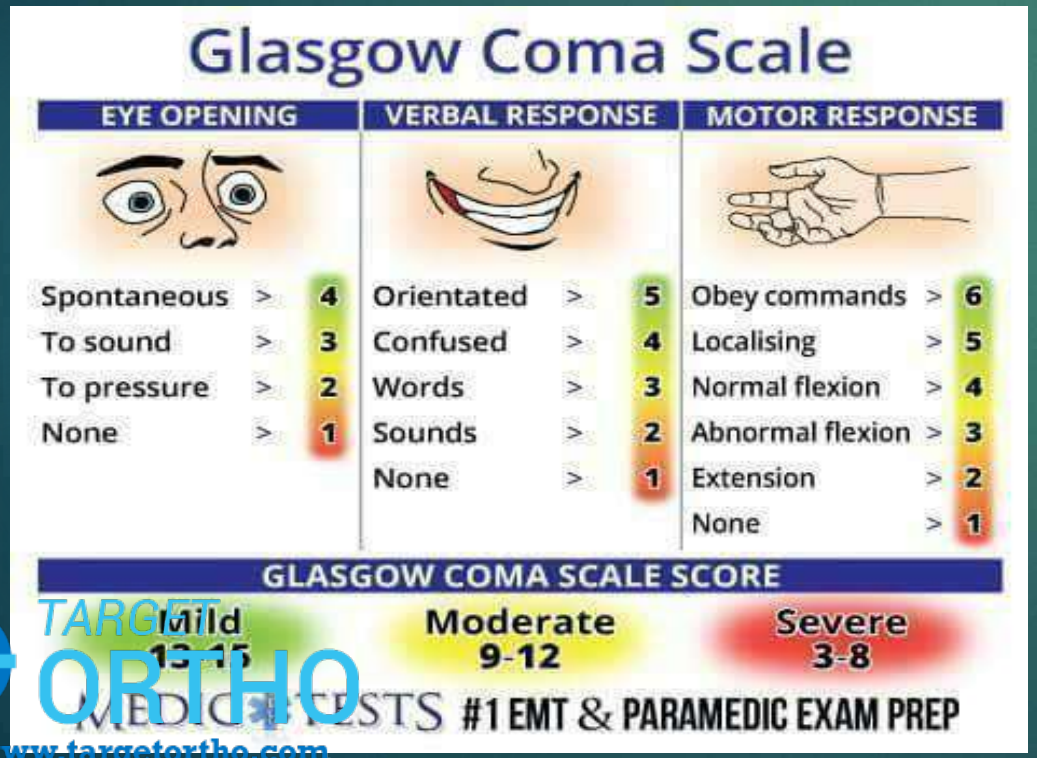
A) **A- AIRWAY & CERVICAL SPINE CONTROL**: Assess patency of airway & use a cervical collar for stabilization if neck injury is suspected. Use of high flow oxygen

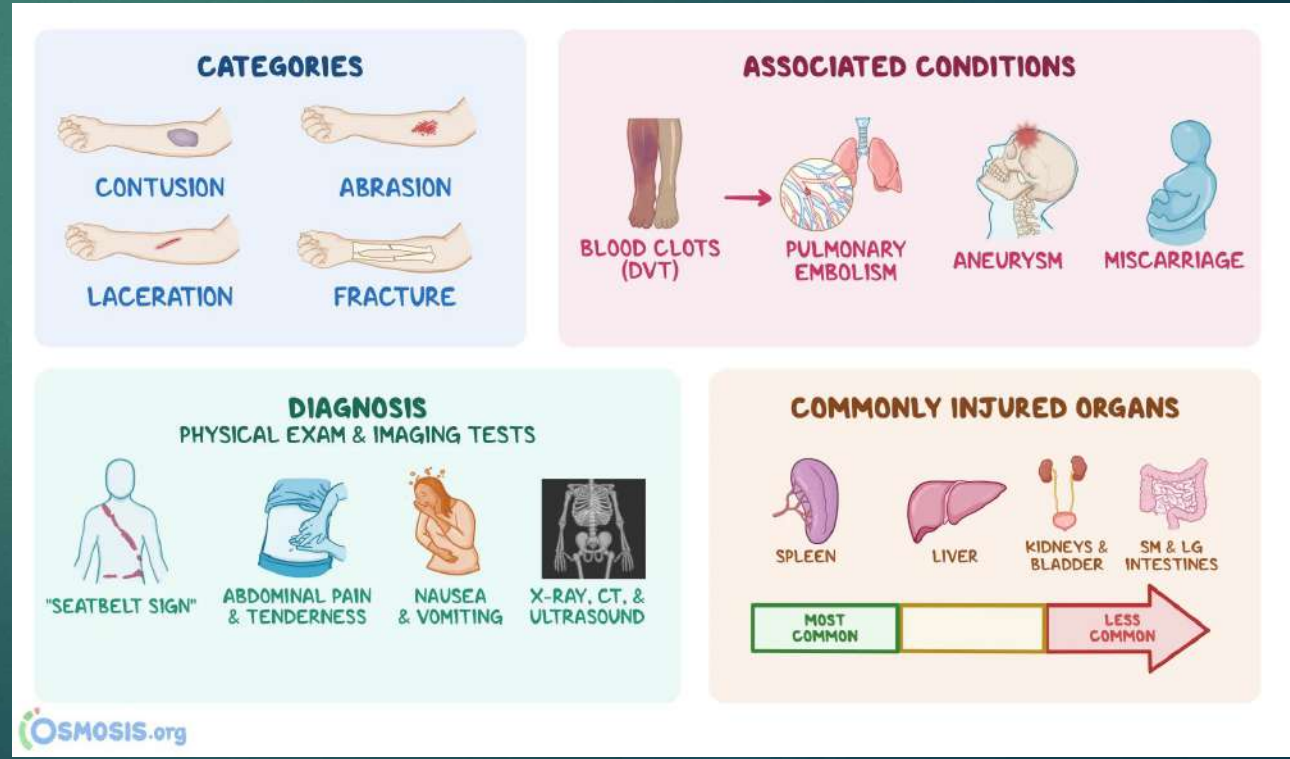
B) **B- BREATHING & VENTILATION**: Check about breathing if patient is doing it alone effectively (Active) . If not ventilate passively by **AMBU bag/mask/mouth to mouth.**

C) **C-CIRCULATION**: Assess pulse volume (if low) presume shock as leading to hypovolemia. Look out for external bleeding & control with tourniquet. Give iv fluids with cannula in any type of shock

- **D- DISABILITY**: Measure of neurologic function. In absence of head injury suspect hypoxia/hypovolemia or high ICP as cause of injury with re look on Airway, Breathing & Circulation. Use of GCS is recommended

- **E- EXPOSURE**: Expose all the parts of body so that no injury is concealed. Maintain confidentiality while doing it. Also look if signs of hypothermia is present





GCS- GLASSGOW COMA SCORE

- The GCS is scored between 3 and 15,
- 3 being the worst and 15 the best.
- It is composed of three parameters:
  - best eye response (E),
  - best verbal response (V),
  - and best motor response (M).
- The components of the GCS should be recorded individually;
- for example, E2V3M4 results in a GCS score of 9.
- A score of 13 or higher correlates with mild brain injury,
- A score of 9 to 12 correlates with moderate injury,
- A score of 8 or less represents severe brain injury.

TABLE 38-2

Glasgow Coma Scale

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	*Best response*	15
	Comatose client	8 or less
	Totally unresponsive	3

SAFETY, SCENE, SITUATION

MOI – Predicted Injury Patterns, C Spine injury?

PATIENT ASSESSMENT TRIANGLE

Big Sick!

"BACK UP"

Appearance (AVPU)

Effort of Breathing

Colour (circulation)

C E CATASTROPHIC HAEMORRHAGE

Pressure, Compression Packing

Torso

Limbs

Tourniquet

A E AIRWAY

Consider C spine (jaw thrust)
Visually check airway
STEPWISE Approach

OXYGEN

MEDICAL

If a deficit is observed during PAT, an SPO2 reading must be obtained before oxygen therapy is commenced

TRAUMA

High flow oxygen to be administered on 'A' as trauma is a major cause of hypoxia

B E BREATHING

Rate, Depth, Efficacy

FLAPS

Feel
Look
Auscultate
Percuss
Search Back/armpits

TWELVE

Trachea
Wounds
Emphysema (subcutaneous)
Larynx
Veins (jugular distension)
Evaluate

C E CIRCULATION

Pulse (radial—carotid)
Capillary Refill Tike (central)
Temparature

Blood on the Floor + 4 more

Chest
Abdomen
Pelvis
Long bones
} SAM pelvic Splint

TCP

Tourniquet—check
Compression—check dressing
Pelvis—apply SAM pelvic splint (consider MOI, abdominal or lower limb injuries)

D E DISABILITY

AVPU
PERRL
Haemoglucose Test (HGT)

HEAD INJURY

Check for;
Base of skull/cranial/scalp/facial injury

E

Expose—Environment—Evaluate—Evacuate
Reassess!

RESUSCITATE & STABILISE

- USE OF LARGE IV CANNULAS WITH IV FLUIDS MUST BE KEPT READY AT DIPOSAL .
- PULSE OXYMETER FOR SpO2 & Pulse rate assessment.
- Portable ECG machine (if availaible) is recommended
- Emergency drugs LIKE ATROPINE, ADRENALINE , HYDROCORT, AVIL,AMIODARONE must be kept ready at disposal

FOCUSSED HISTORY

ADDITIONAL HISTORY

A- Age & Sex of patient

M- Mechanism of injury or circumstances around event

I- Injuries sustained or problems identified

S- Signs/symptoms

T- Treatment given

OTHER IMPORTANT POINTS

A- Allergies

M- Medications

P- Past illness/pregnancy

L- Last oral intake(Solid/Fluid)

E- Events related to situation

Hs and Ts- REVERSIBLE CONDITIONS

7 Hs

- Hypovolemia
- Hypoxia
- Hydrogen ion excess (acidosis)
- Hypoglycemia
- Hypokalemia
- Hyperkalemia
- Hypothermia

5 Ts

- Tension pneumothorax
- Tamponade – Cardiac
- Toxins
- Thrombosis (pulmonary embolus)
- Thrombosis (myocardial infarction)

DEFINITIVE CARE

- INVOLVES CRITICAL MANUEVERERSs & WORKING UP WITH RESCUING TEAM TO CONTINUE CPR UNLESS PATIENT SAFELY REACHES an advanced medical facility.

- Involves investigations like Imaging, CXR, ECG , ABG, Electrolytes, cardiac markers, ECHO etc. to look for detailed cause & further treatment as needed (5H & 4T)

SECONDARY SURVEY

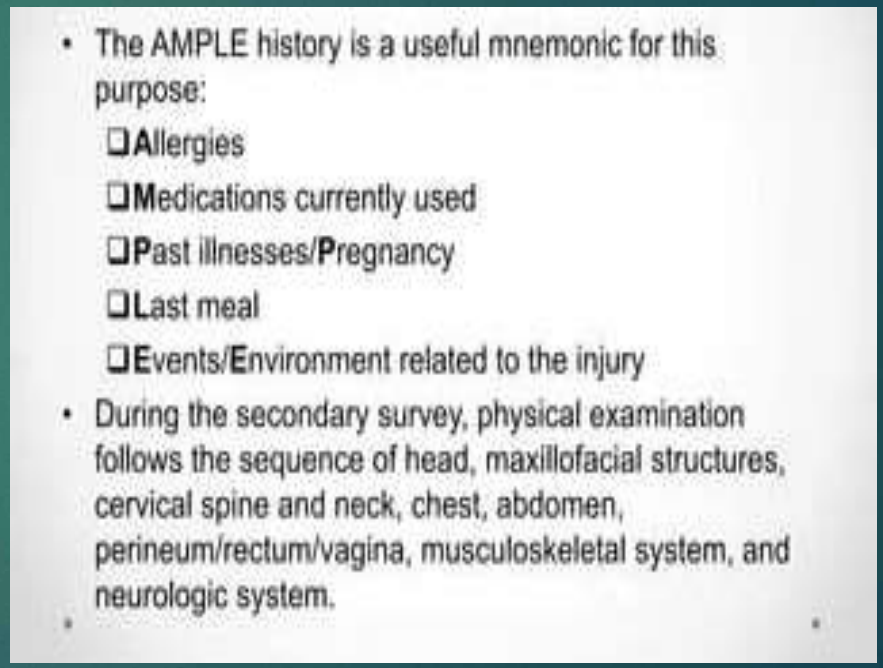
Mnemonic	Secondary survey
Has	Head/skull
My	Maxillofacial
Critical	Cervical Spine
Care	Chest
Assessed	Abdomen
Patient's	Pelvis
Priorities	Perineum
Or	Orifices (PR/PV)*
Next	Neurological
Management	Musculoskeletal
Decision?	Diagnostic tests/ definitive care

*Tubes and fingers in every orifice. Include "AMPLE" history.

SECONDRY SURVEY

AMPLE

- History(AMPLE)
- Head-to-toe physical exam
- Complete neuro exam
- Diagnostic tests
- Reevaluation



- The AMPLE history is a useful mnemonic for this purpose:
  - ❑**A**llergies
  - ❑**M**edications currently used
  - ❑**P**ast illnesses/**P**regnancy
  - ❑**L**ast meal
  - ❑**E**vents/**E**nvironment related to the injury
- During the secondary survey, physical examination follows the sequence of head, maxillofacial structures, cervical spine and neck, chest, abdomen, perineum/rectum/vagina, musculoskeletal system, and neurologic system.

MANAGING A COLLAPSED ATHLETE & BASIC LIFE SUPPORT

BASIC LIFE SUPPORT FOR COLLAPSED ATHLETE

- **CHECK FOR DANGERS:** Ensuring safety of victim & rescuer

- **CHECK FOR RESPONSE:** Shout & ask if patient is alright. If no response comes out shout for help Call for support staff & palpate the carotid pulse for ten seconds If Pulseless start CPR.

- **CHECK FOR AIRWAY:** Look for foreign body/choking. Open the airway using HEAD TILT & CHIN LIFT maneuver. If a C Spine injury is suspected use JAW LIFT maneuver.

- **CHECK FOR BREATHING:** If breathing Place in recovery position

If not breathing Call for help with EMS activation for AED & start Chest compressions immediately @100-120/min at 5-6 cm depth with time allowed for elastic recoil. This is combined with 2 rescue breaths @ ratio of 30:2

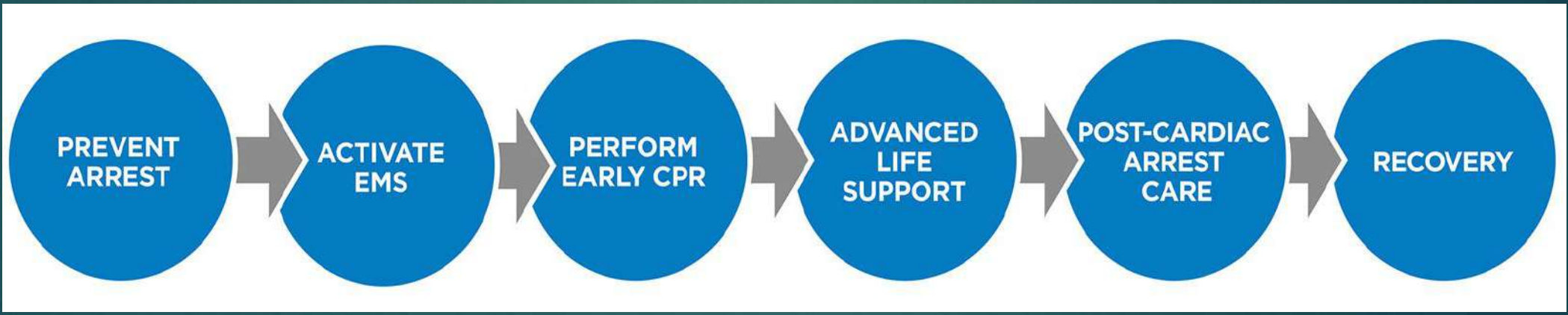
- **MAINTAIN CIRCULATION:** Using chest compressions unless AED arrives

INITIATING CHAIN OF SURVIVAL

- Adult Chain of Survival

PEDIATRIC CHAIN

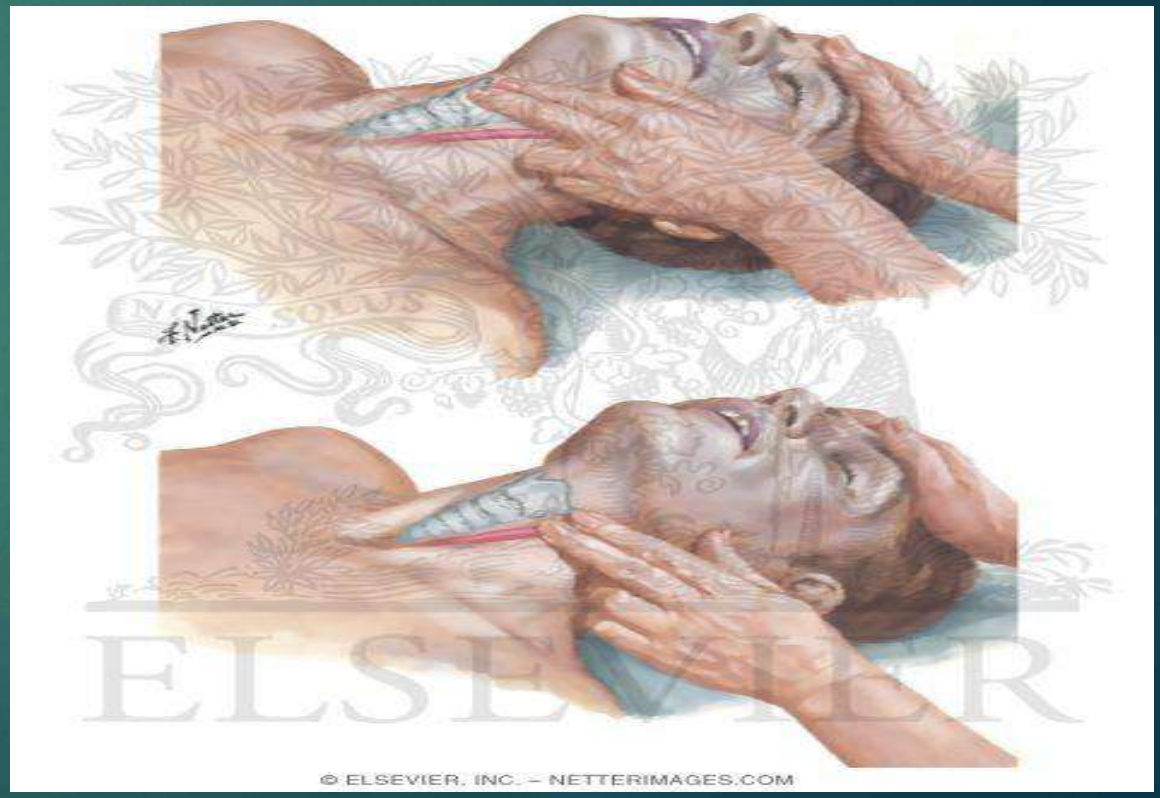
- The first and most important step of the Pediatric Chain of Survival is prevention
- PREVENT ARREST



MANEUVERES..

AIRWAY MANUEVERS

CAROTID PULSE PALPATION



Head tilt/Chin lift

- The maneuver is performed by tilting the head backwards in unconscious patients, often by applying pressure to the forehead and the chin.
- RULE OUT CERVICAL INJURY
- NO DANGER OF ASPIRATION

JAW THRUST

- It is performed by placing the index and middle fingers to physically push the posterior aspects of the lower jaw upwards while their thumbs push down on the chin to open the mouth.
- When the mandible is displaced forward, it pulls the tongue forward and prevents it from obstructing the entrance to the trachea

RE ASSESSMENT

Involves re assessing patient again & again to look for any significant deterioration .

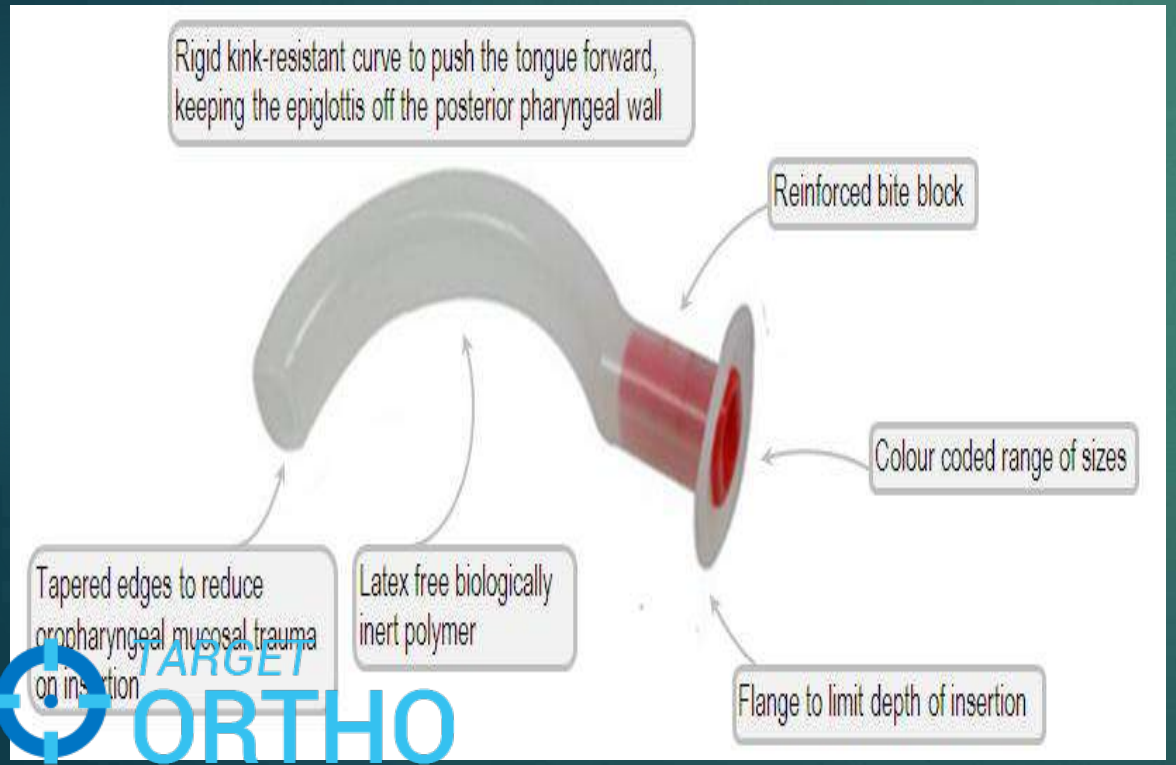
It will involve doing any significant intervention if needed to change the course

Table 1. *Basics of the ABCDE approach*

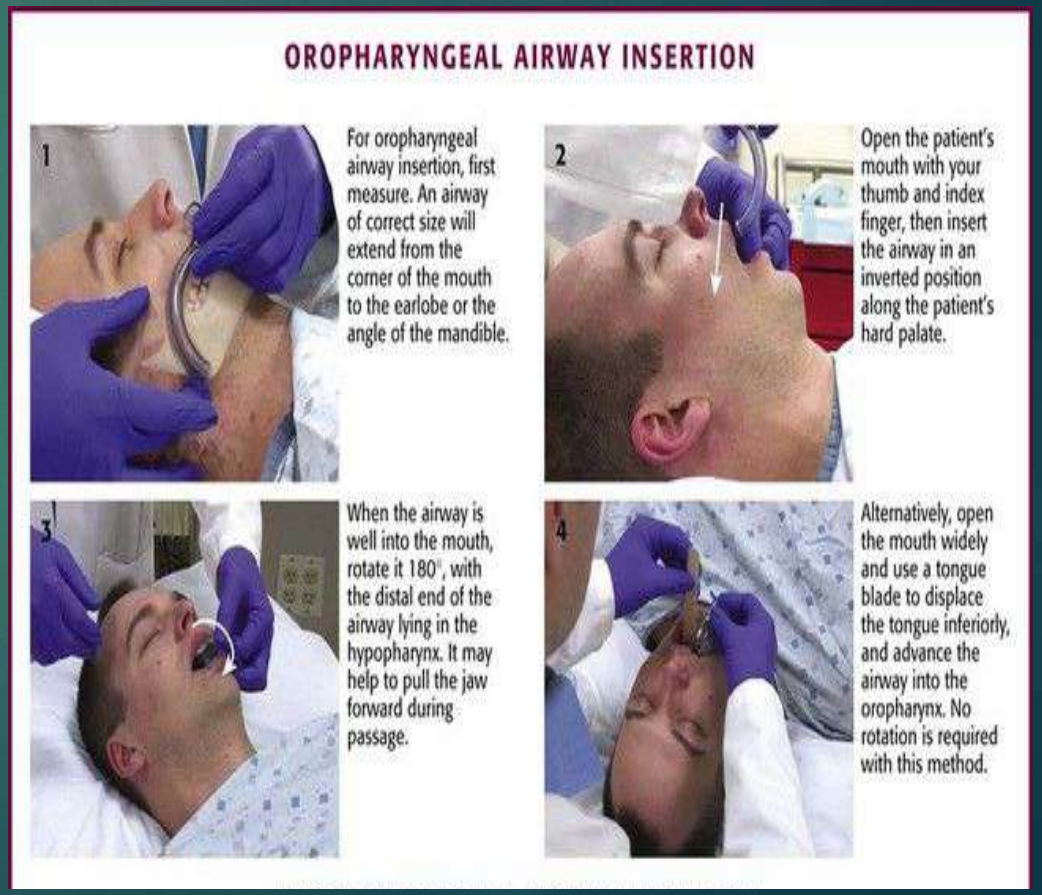
Letter	Life-threatening condition
A – Airway	Airway blockage, cervical spine injury
B – Breathing	Tension pneumothorax, pulmonary oedema, bronchospasm
C – Circulation	Shock (hypovolaemic, obstructive, distributive, cardiogenic)
D – Disability	Seizure, hypoglycaemia, meningitis, intracranial haemorrhage or infarction, intoxication
E – Exposure	Hypothermia or hyperthermia, critical skin conditions such as fasciitis or urticaria

AIRWAY SECURING DEVICES

OROPHARYNGEAL AIRWAY



INSERTION GUIDE



GUEDEL DISPOSABLE AIRWAY

Oropharyngeal airways come in a wide range of sizes (e.g., 40 mm to 110 mm).

Measuring from the center of the mouth to the angle of the jaw, or from the corner of the mouth to the earlobe.

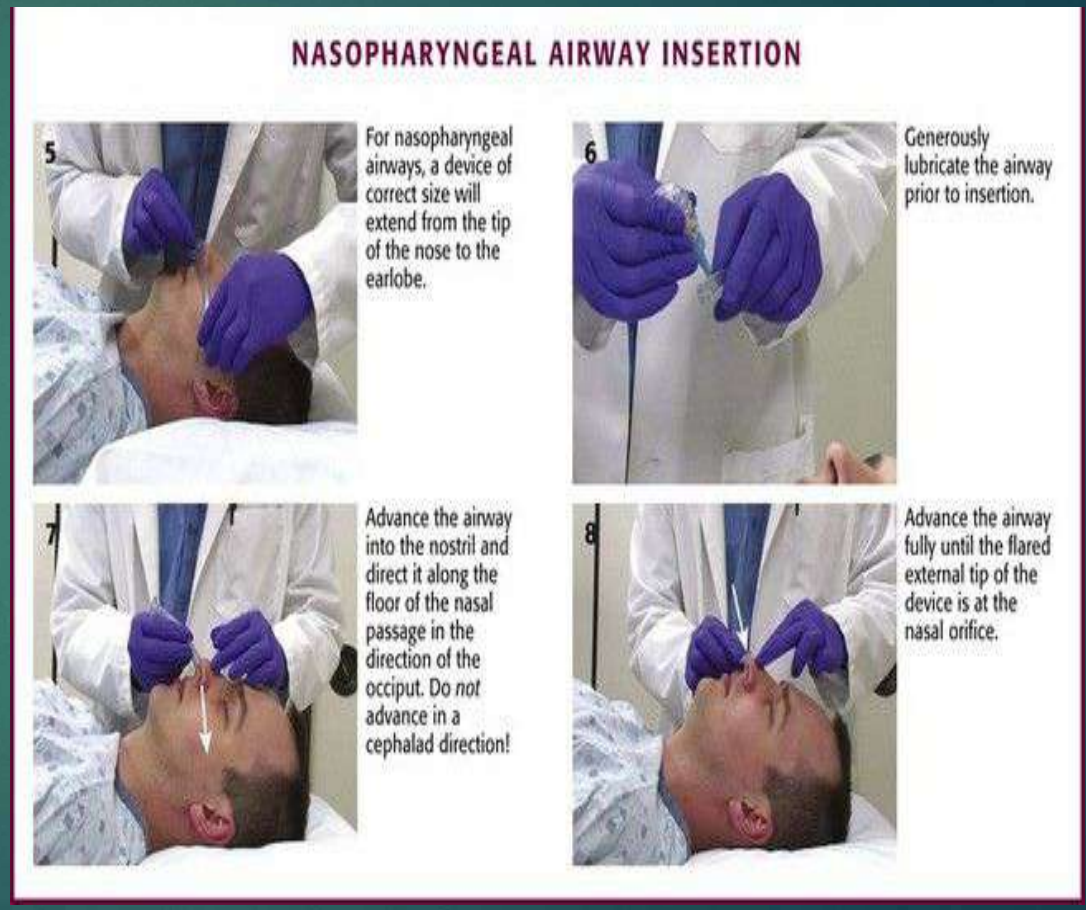
The mouth is opened using the "crossed or scissors" finger technique.

Size	Size No.	Dimension	Color
Neonatal	00	40 mm	Pink
Infant	0	50 mm	Lt Blue
Child	1	60 mm	Black
Small Adult	2	70 mm	White
Adult	3	80 mm	Green
Large Adult	4	90 mm	Yellow
XL Adult	5	100 mm	Red
XXL Adult	6	110 mm	Orange

NASOPHARYNGEAL AIRWAY

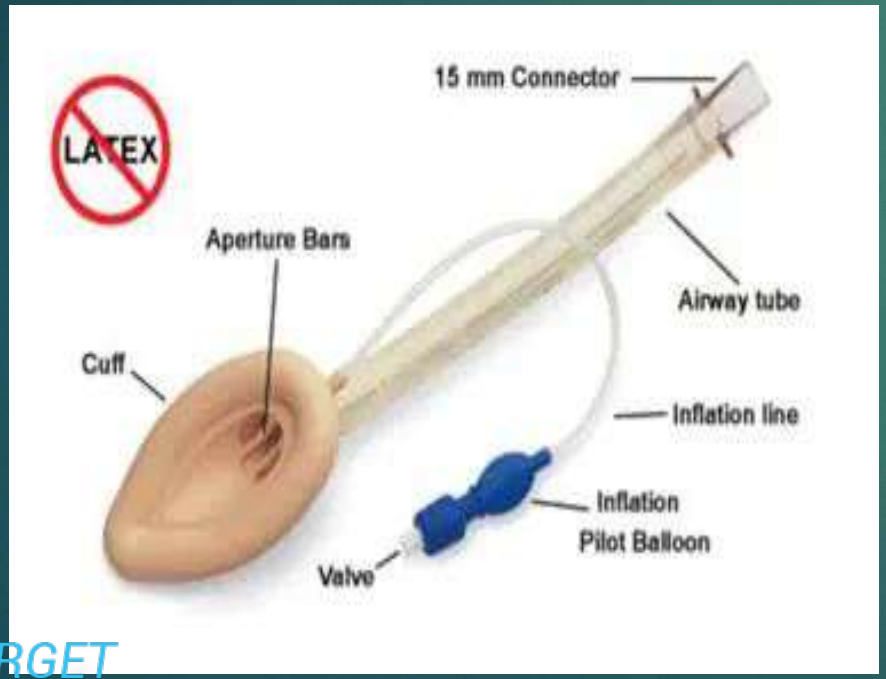
Provide an airway passage from the nose to the posterior pharynx.

NPAs can create a patent pathway and help avoid airway obstruction due to hypertrophic tissue.

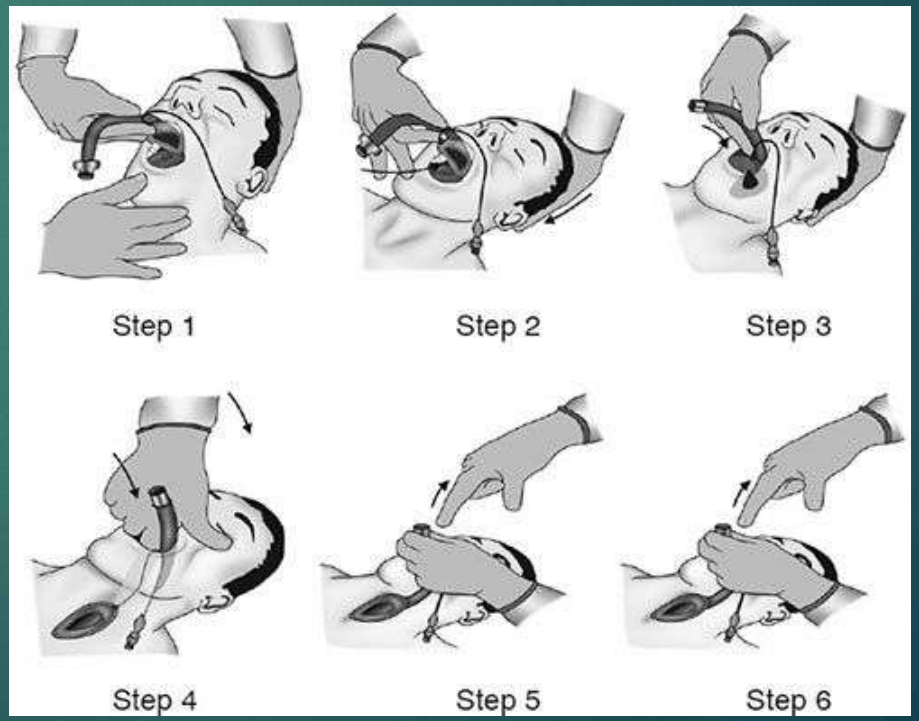


LMA

LARYNGEAL MASK AIRWAY



LMA INSERTION



LMA

- Laryngeal mask airways (LMA) are supraglottic airway devices.
- Temporary method to maintain an open airway during the administration of anesthesia or as an immediate life-saving measure in a difficult or failed airway.
- Designed to be inserted blindly through the mouth and into the hypopharynx to seal around the glottic opening allowing for ventilation.
- Better to be used in RODS
- Restriction, Obstruction/Obesity, Disrupted or Distorted anatomy, and Short thyromental distance.
- Restriction refers to both increased airway resistance - extraglottic devices have lower leak pressures than endotracheal tubes - as well as restricted mouth opening insufficient to allow for passage of the device.

LMA Contraindications

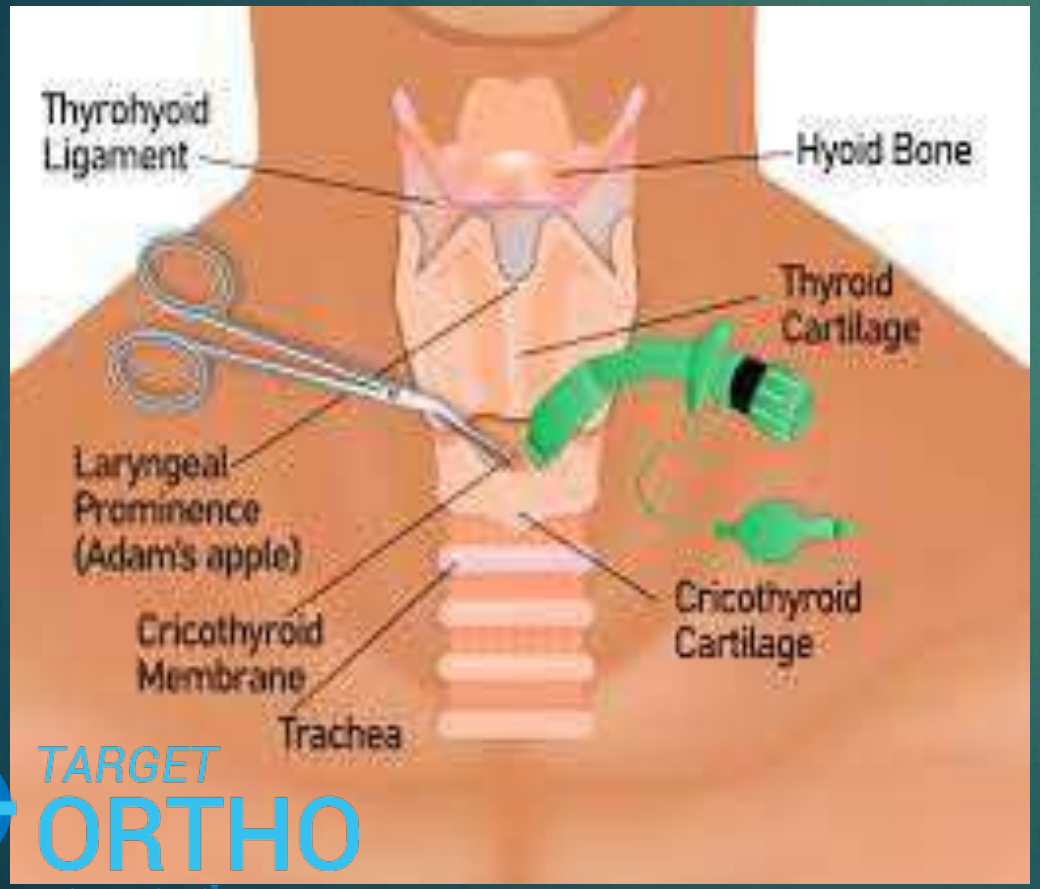
- They may stimulate the gag reflex, and, therefore, should not be used in a conscious or awake patient.

Contraindications to elective use include

- ✔ Poor pulmonary compliance,
- ✔ High airway resistance,
- ✔ Pharyngeal pathology,
- ✔ Risk for aspiration,
- ✔ Airway obstruction below the larynx.

EMERGENCY CRICOTHYROIDOTOMY

ANATOMICAL PLACEMENT



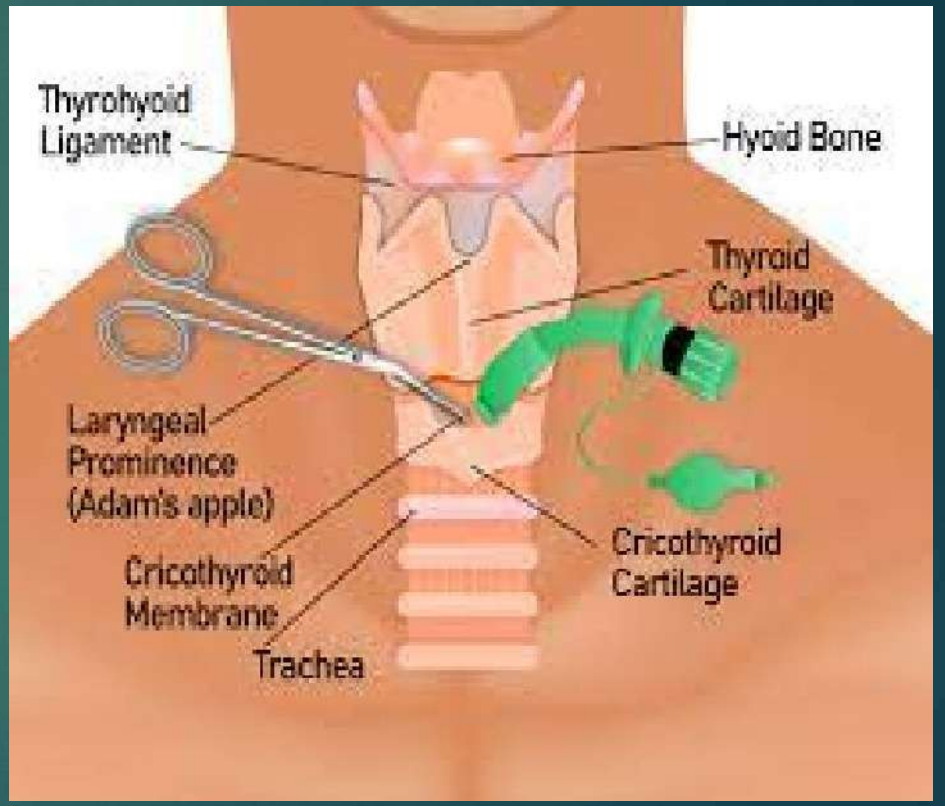
INDICATIONS

Table 1. Indications for Cricothyrotomy

Upper airway hemorrhage
Midfacial fractures
Abnormal facial anatomy Acquired Congenital
Airway trauma Inhalational or thermal Foreign body Laryngeal disruption
Airway edema
Mass (tumor, hematoma, abscess)
Supraglottitis

EMERGENCY CRICOTHYROIDOTOMY

- Cricothyrotomy is performed by inserting a tube through an incision in the cricothyroid membrane.
- The cricothyroid membrane (CTM) is bordered superiorly by the thyroid cartilage, inferiorly by the cricoid cartilage, and laterally by the bilateral cricothyroideus muscles.
- The CTM is approximately 2 cm inferior to the laryngeal prominence and superior to the cricoid cartilage, which is identified by palpating a slight depression between the two cartilaginous structures.



- The emergency cricothyrotomy is the final step in the emergency airway management algorithm, becoming necessary when you find yourself in a CICO scenario.

1. Cannot Intubate,
2. Cannot Oxygenate is sometimes referred to as "Cannot Intubate, Cannot Ventilate"

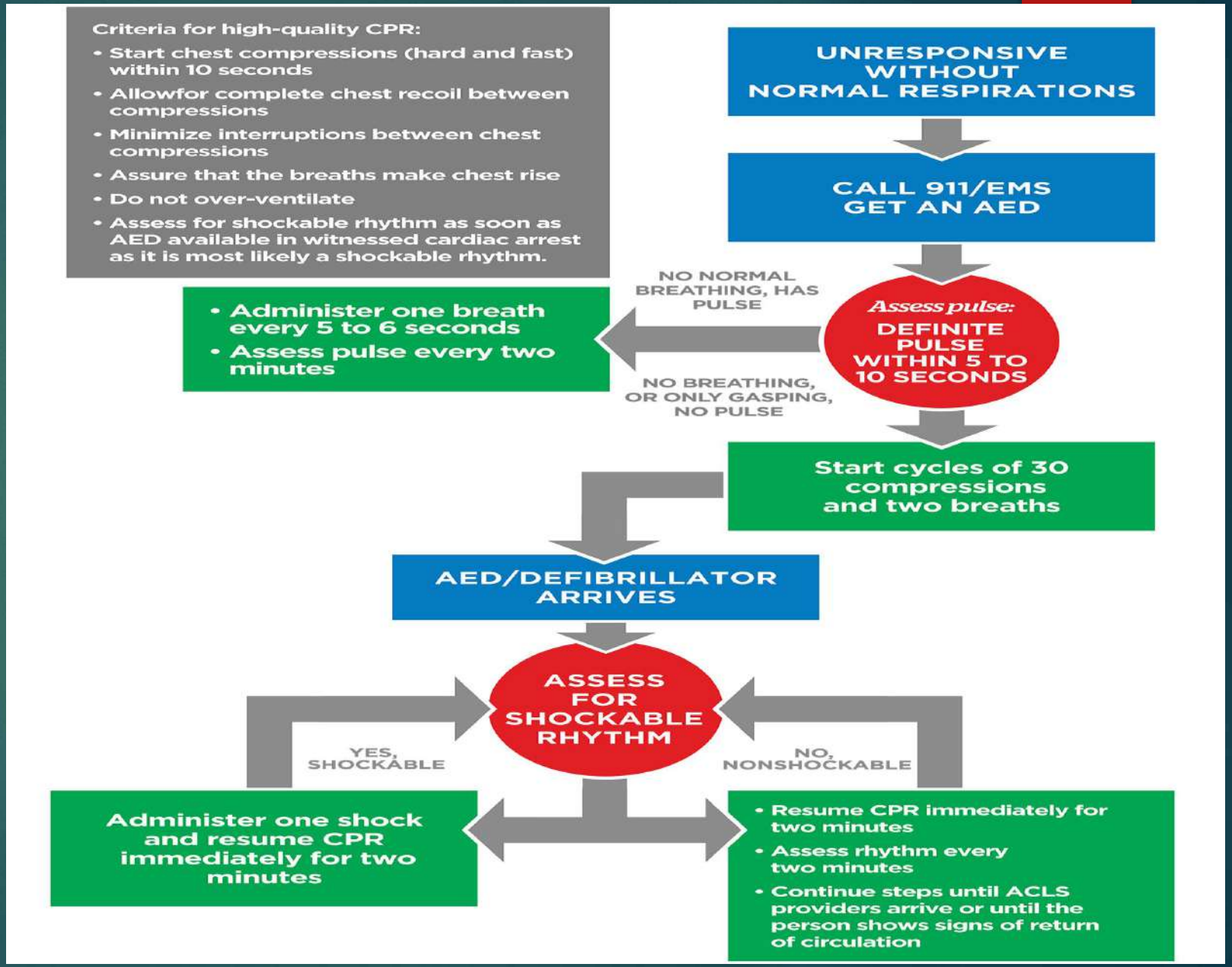
In the CICO situation, there are no absolute contraindications to emergent cricothyrotomy.

Contraindications:

a) Tracheal surgery, Fractured larynx, Laryngotracheal disruption,

b) children less than 5 to 12 years because of the funnel shape of the pediatric airway and a theoretically increased risk of subglottic stenosis.

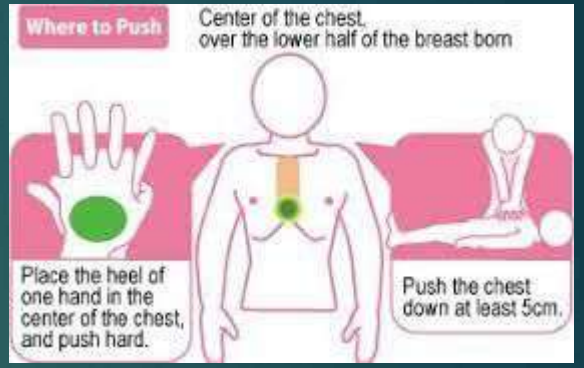
BLS ALGORITHM



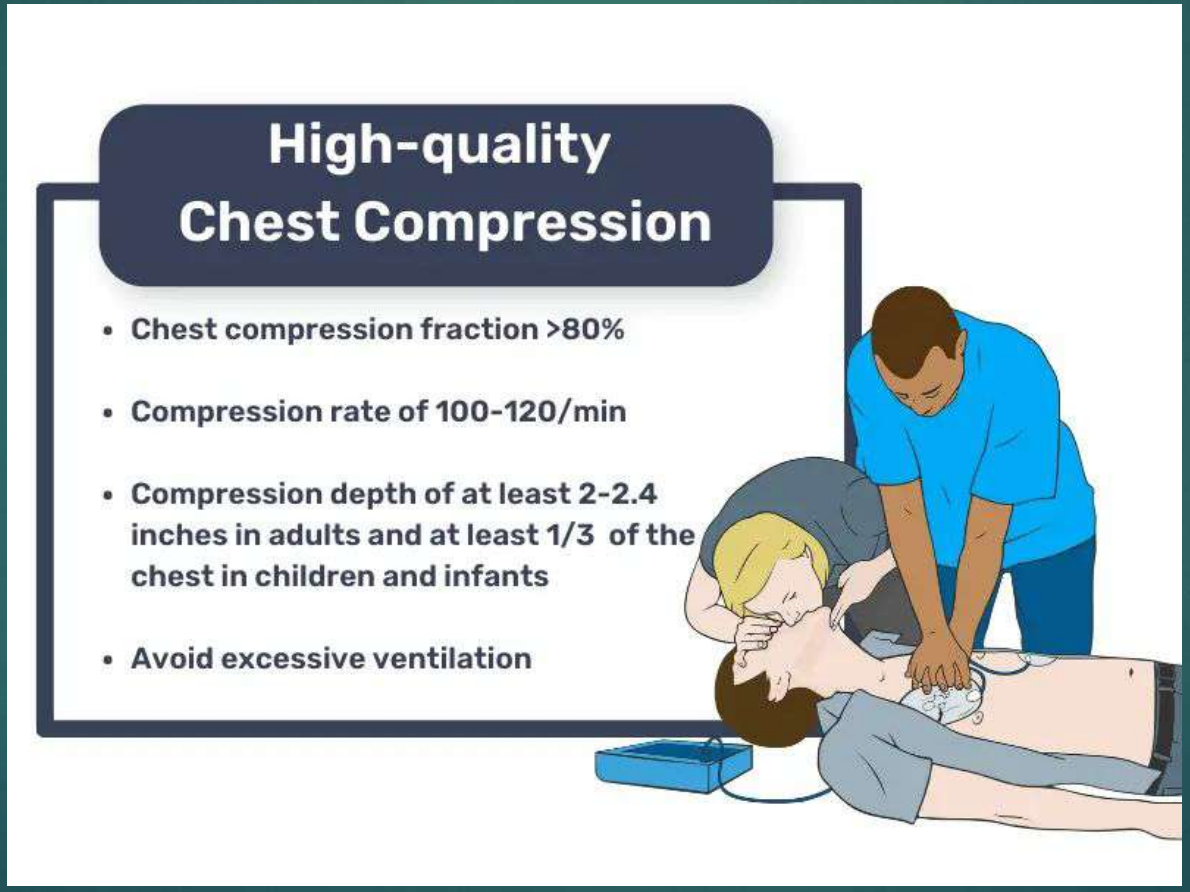
CPR STEPS

- Check for the carotid pulse on the side of the neck (Figure A).
- Keep in mind not to waste time trying to feel for a pulse; feel for no more than 10 seconds.

- If you are not sure you feel a pulse, begin CPR with a cycle of 30 chest compressions and two breaths.
- Use the heel of one hand on the lower half of the sternum in the middle of the chest. (Figure B)
- Put your other hand on top of the first hand .
- Straighten your arms and press straight down (Figure C). Compressions should be 2 to 2.4" (5 to 6 cm) into the person's chest and at a rate of 100 to 120 compressions per minute.



CHEST COMPRESSION



- Be sure that between each compression you completely stop pressing on the chest and allow the chest wall to return to its natural position.
- Leaning or resting on the chest between compressions can keep the heart from refilling in between each compression and make CPR less effective.
- After 30 compressions, stop compressions and open the airway by tilting the head and lifting the chin.

a. Put your hand on the person's forehead and tilt the head back.

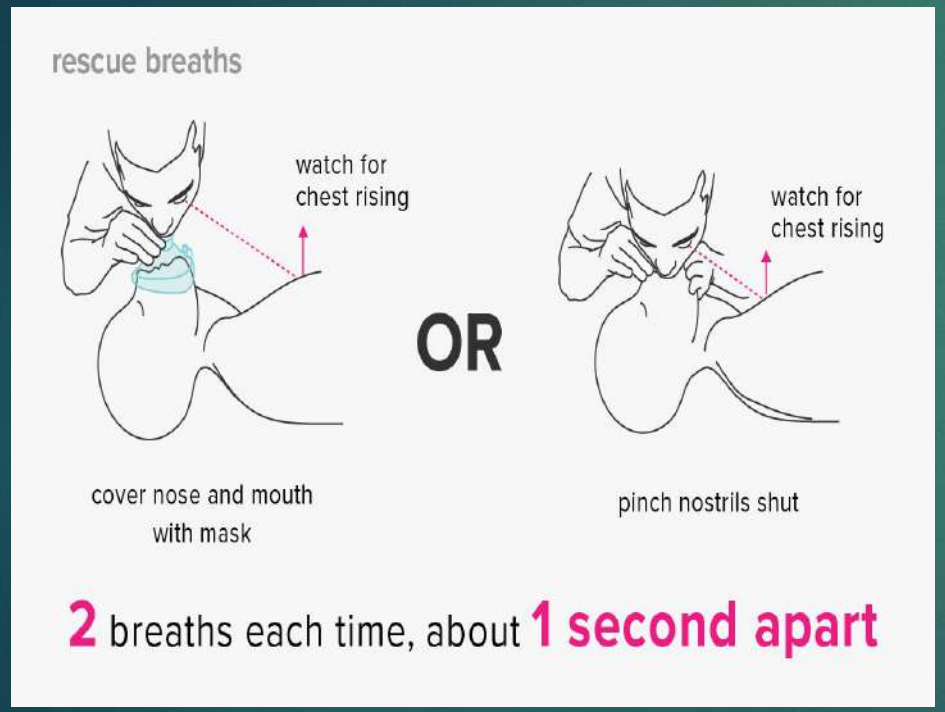
b. Lift the person's jaw by placing your index and middle fingers on the lower jaw; lift up.

c. Do not perform the head-tilt/chin-lift maneuver if you suspect the person may have a neck injury.

In that case, the jaw-thrust is used.

d. For the jaw-thrust maneuver, grasp the angles of the lower jaw and lift it with both hands, one on each side, moving the jaw forward. If their lips are closed, open the lower lip using your thumb.

RESCUE BREATHS



- Give a breath while watching the chest rise.
- Repeat while giving a second breath.
- Breaths should be delivered over one second.
- Resume chest compressions. Switch quickly between compressions and rescue breaths to minimize interruptions in chest compressions.

IMP POINTS FOR GOOD CPR

- HIGH LEVEL CPR WITHN MINIMUM INTERRUPTIONS & TIME GIVEN FOR RECOIL.
- REGULAR SUPPLY OF OXYGEN CAN BE HELPFUL
- USE AIRWAY SECURING DEVICES & WAVE FORM CAPNOGRAPHY WHENEVER POSSIBLE
- ENSURE GOOD VASCULAR ACCESS
- CORRECT REVERSIBLE CAUSES (5H & 4T)(Part of ACLS)
- ARRANGE FOR AED TO LOOK FOR SHOCKABLE RHYTHM OTHERWISE KEEP ADRENALINE HANDY (0.5-1 ml repeated every 3-5 mins)

ADULT MOUTH-TO-MASK VENTILATION

1. Give 30 high-quality chest compressions.

2. Seal the mask against the person's face by placing four fingers of one hand across the top of the mask and the thumb of the other hand along the bottom edge of the mask (Figure A).

3. Using the fingers of your hand on the bottom of the mask, open the airway using the head-tilt/chin-lift maneuver. (Do not do this if you suspect the person may have a neck injury) (Figure B).

4. Press firmly around the edges of the mask and ventilate by delivering a breath over one second as you watch the person's chest rise (Figure C).

ADULT BAG-MASK VENTILATION IN TWO-RESCUER CPR

- If two people are present and a bag-mask device is available, the second rescuer is positioned at the victim's head while the other rescuer performs high-quality chest compressions. 1. Deliver 30 high-quality chest compressions while counting out loud (Figure A).

2. The second rescuer holds the bag-mask with one hand using the thumb and index finger in the shape of a "C" on one side of the mask to form a seal between the mask and the face, while the other fingers open the airway by lifting the person's lower jaw (E) (Figure B).

3. The second rescuer gives two breaths over one second each as you watch the person's chest rise (Figure C).

4. Practice using the bag-valve-mask; it is essential to forming a tight seal and delivering effective breaths.

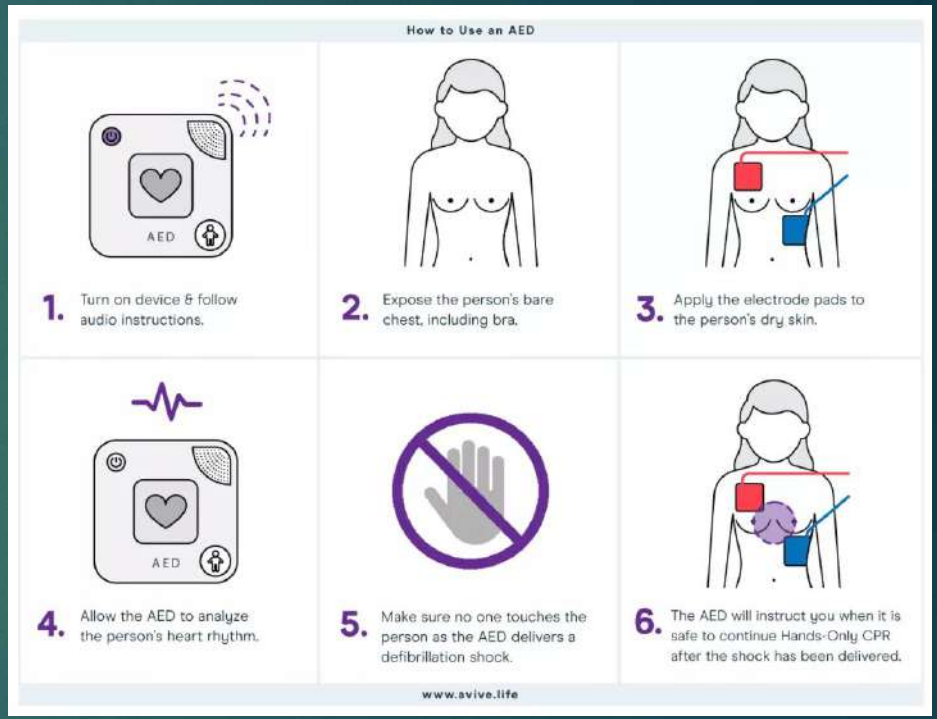
USE OF AUTOMATED EXTERNAL DEFIBRILLATOR

CARDIAC ARREST... Ventricular fibrillation (MCC)

The automated external defibrillator (AED) is a device that recognizes ventricular fibrillation and other dysrhythmias and delivers an electric shock at the right time.

AEDs will shock monomorphic and polymorphic ventricular tachycardia (VT) if the rate exceeds preset values.

AEDs should be operated only on patients who are unresponsive, not breathing, and have no signs of circulation.



Principle of Early Defibrillation

Early defibrillation is critical to survival from cardiac arrest for several reasons:

(1) the most frequent initial rhythm in witnessed sudden cardiac arrest is VF;

(2) the most effective treatment for VF is electrical defibrillation;

(3) the probability of successful defibrillation diminishes rapidly over time; and

(4) VF tends to convert to asystole within a few minutes

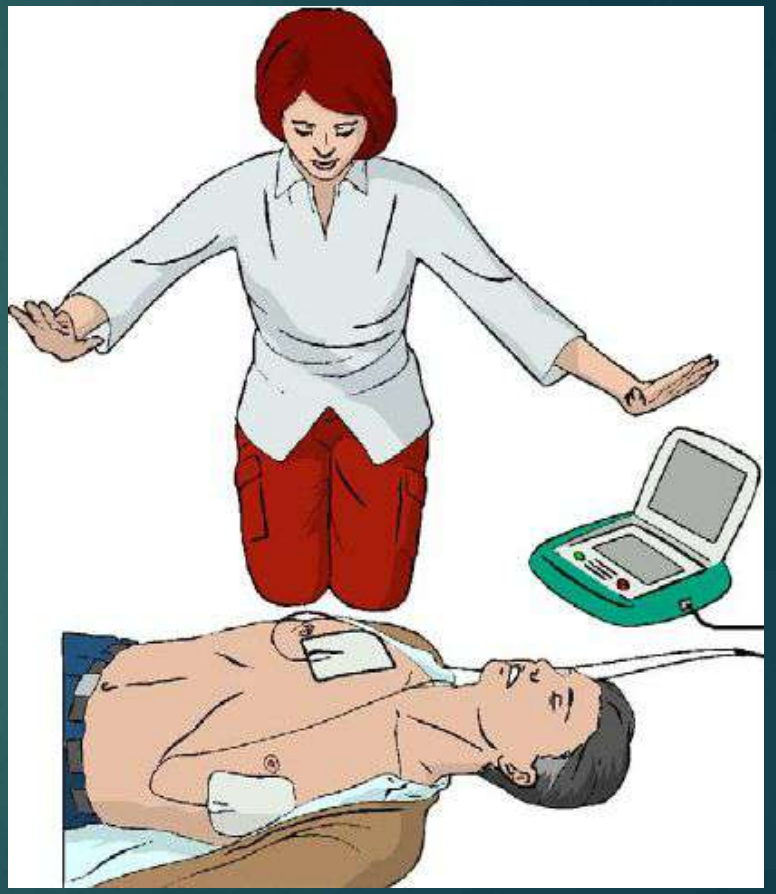
SREP 1:TURN ON AED

- Place the AED next to the patient and open the carrying case or the top of the AED.

- Turn the power on (some devices will "power on" automatically when you open the lid or case).

“Clear” the victim and ANALYZE the rhythm

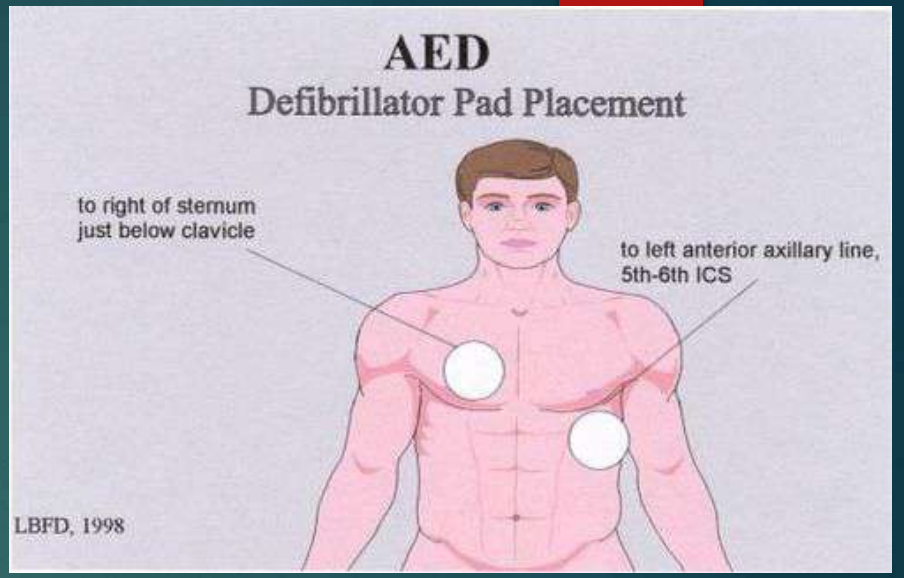
- AED will prompt you to clear the victims during rhythm analyzing.
- Be sure no one touches the victim, including the HCW in charge of giving breath.
- Some defibrillator with AED function will prompt the operator to push a button for analyzing the heart rhythm; others will do that automatically.
- The AED then tells you if a shock is needed



If the AED advises a shock, it will tell you to clear the victim.

- Clear the victim from contact with people before delivering the shock; be sure no one is touching the victim.
- Loudly shout out "CLEAR" and perform a rapid visual scan to ensure everyone is cleared from touching the patient.
- The rescuer should then press the SHOCK button
- The shock will be delivered by producing a sudden contraction of the victim's muscle.

STEP 2: ATTACH AED pads



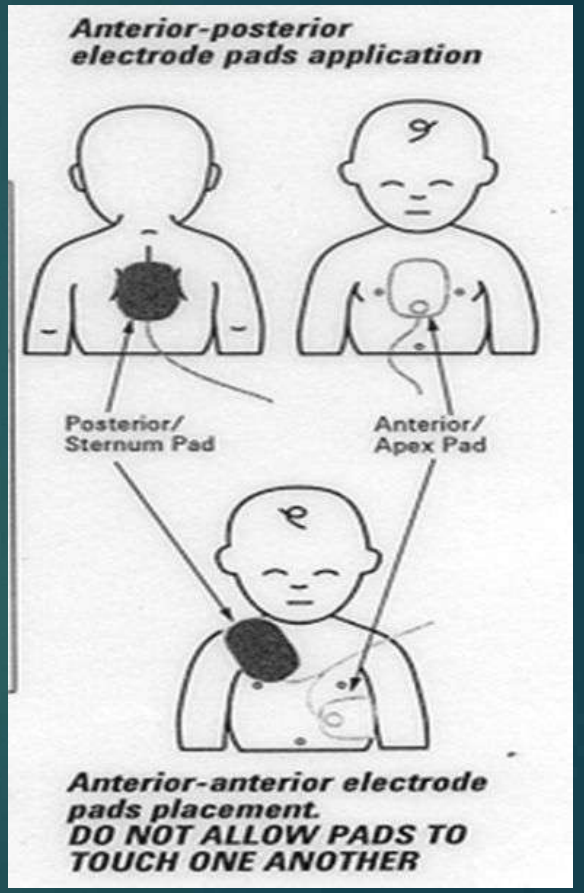
- Choose adult pads for victims 8 years of age or older.
- Peel open the AED pads
- Attach the adhesive pads to the victim's bare chest
- Place one AED pad on the victim's right upper chest (directly below clavicle)
- Place another AED pad to the side of the apex of the heart
- The placement of the AED should not interrupt the chest compression
- Any open flow of oxygen should be diverted away from the chest to avoid fire hazard

- Immediately resume CPR after delivering of the shock.
- However, if the shock is not indicated, there will be no shock advice from AED and the HCW has to continue with chest compression immediately.
- After 5 cycles or 2 minutes of CPR, the device will prompt you to repeat steps.
- If “no shock advised”, the HCW should immediately restart CPR

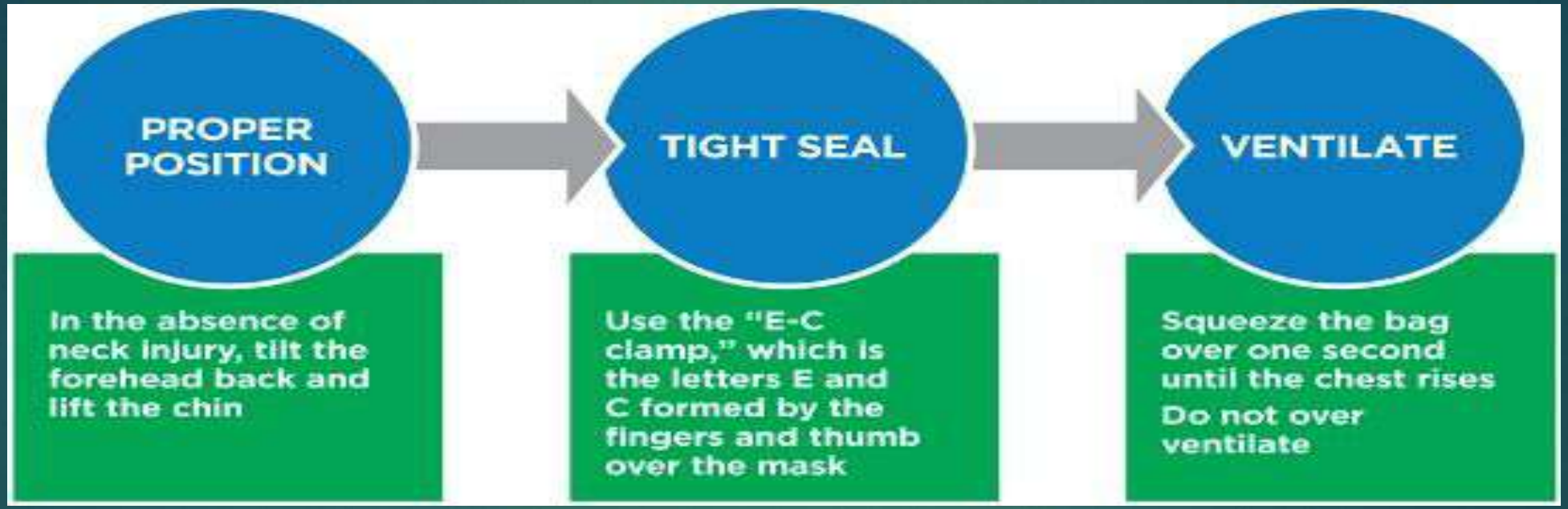
Children aged between 1 and 8 years old:

- Special pediatric pads should be used
- for children aged 1-8 years old.
- In situation in which there is no AED with a pediatric dose-attenuator system, the HCP may use an adult AED.
- For infants, a manual defibrillator is preferred.
- The pads should be applied as in adults or in antero-posterior

(back – front) position

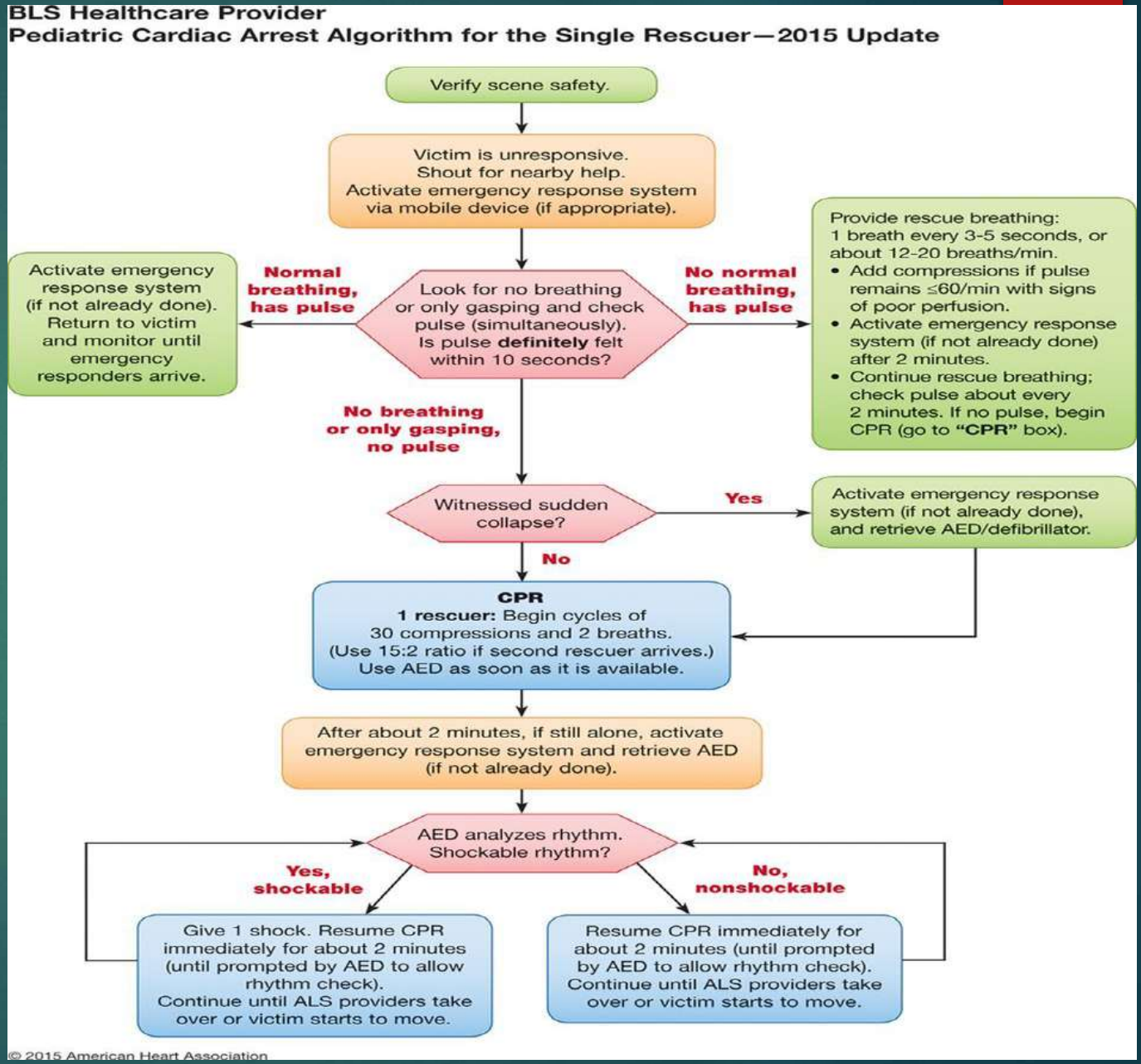


Child Ventilation Algorithm



PEDIATRIC BLS ALGORITHM

In infants and children, asphyxial cardiac arrest is more common than cardiac arrest from a primary cardiac event; therefore, ventilation may have greater importance during resuscitation of children.



Components of High-Quality CPR

- The 5 components of high-quality CPR are

1. Ensuring chest compressions of adequate rate
2. Ensuring chest compressions of adequate depth
3. Allowing full chest recoil between compressions
4. Minimizing interruptions in chest compressions
5. Avoiding excessive ventilation

STEPS

1. Check the scene for safety, form an initial impression, obtain consent from the parent or guardian, and use personal protective equipment (PPE)
2. If the child or baby appears unresponsive, check the child or baby for responsiveness (shout-tap-shout)
3. Check for no more than 10 seconds
4. If the child or baby does not respond and is not breathing or only gasping, CALL EMERGENCY and get equipment, or tell someone to do so

Performing Child & Baby CPR

1. Place the child or baby on their back on a firm, flat surface

- For a child, kneel beside the child
- For a baby, stand or kneel to the side of the baby, with your hips at a slight angle.

2. Give 30 compressions

For a child, place the heel of one hand in the center of the child's chest, with your other hand on top and your fingers interlaced and off the child's chest

Position your shoulders directly over your hands and lock your elbows

Keep your arms straight

Push down hard and fast about 2 inches at a rate of 100 to 120 per minute

Allow the chest to return to normal position after each compression

a) For a small child, use a one-handed CPR technique

- Place the heel of one hand in the center of the child's chest
- Push down hard and fast about 2 inches at a rate of 100 to 120 per minute

b) For a baby, place both thumbs (side-by-side) on the center of the baby's chest, just below the nipple line

Use the other fingers to encircle the baby's chest toward the back, providing support

Using both thumbs at the same time, push hard down and fast about 1 ½ inches at a rate of 100 to 120 per minute

Allow the chest to return to its normal position after each compression

BREATHS

- Give 2 breaths

a) For a child, open the airway to a slightly past-neutral position using the head-tilt/chin-lift technique

b) For a baby, open the airway to a neutral position using the head-tilt/chin-lift technique

- Blow into the child or baby's mouth for about 1 second
- Ensure each breath makes the chest rise
- Allow the air to exit before giving the next breath
- If the first breath does not cause the chest to rise, retilt the head and ensure a proper seal before giving the second breath. If the second breath does not make the chest rise, an object may be blocking the airway

Continue giving sets of 30 chest compressions and 2 breaths until:

1. You notice an obvious sign of life
2. An AED is ready to use
3. Another trained responder is available to take over compressions
4. EMS personnel arrive and begin their care
5. You are alone and too tired to continue
6. The scene becomes unsafe
7. You have performed approximately 2 minutes of CPR (5 sets of 30:2), you are alone and caring for baby, and you need to call EMERGENCY.

Thank you.

FOR ANY QUERIES-

Mail on shikhasportsmed@gmail.com

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