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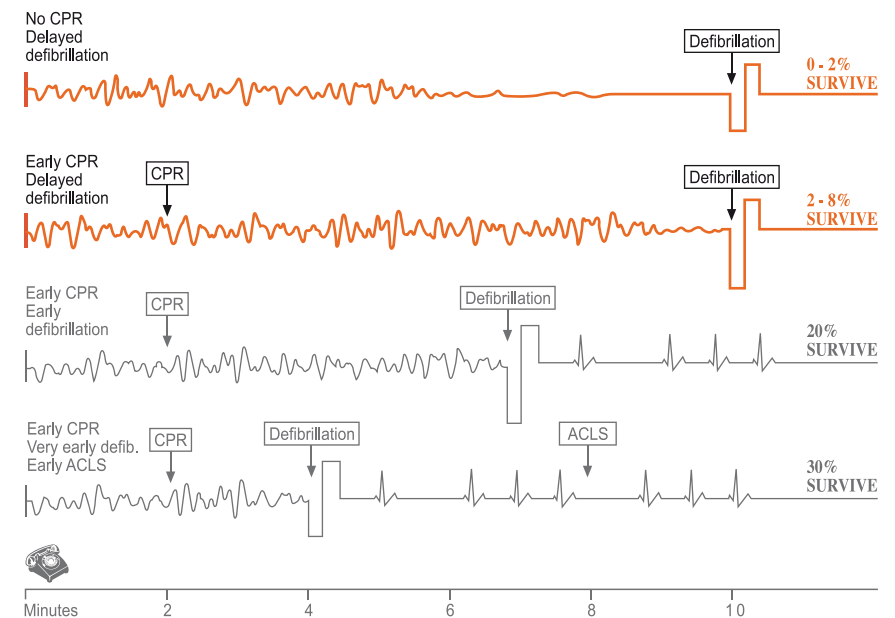


PATIENTS. AT THE HE^{ART} OF ALL WE DO.®



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BASIC CARDIAC LIFE SUPPORT COURSE



Accredited By:



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INTRODUCTION

In Singapore, heart disease and stroke, together contribute to 29% of total mortality. The risk factors that contribute to these diseases are similar, viz. high blood pressure, diabetes mellitus, cigarette smoking and hypercholesterolaemia. Heart disease, by itself constitutes 22.8%. Every year about 1,800 people in Singapore develop cardiac arrest in the out-of-hospital environment. Of these only about 3.4% survive currently. About an equal number develop cardiac arrest within hospitals and approximately 20% survive.

Public education and training in Cardio-Pulmonary Resuscitation (CPR) are crucial in reducing “sudden death” because the majority of these deaths occur out of hospital. One of the most startling ideas of modern medicine is that “sudden death” can be reversed. The actions taken during the first few minutes of an “Emergency” are critical to casualty survival. It can be performed by any of us, anywhere. All that is needed is our appropriate action.



REMEMBER:

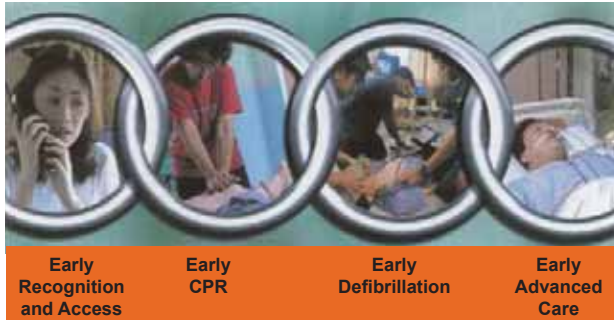
CPR can save lives.

Do it well. Do it right.

And the casualty gets a chance at life.

THE CHAIN OF SURVIVAL

The concept of “Chain of Survival” is the best approach to the treatment of casualties in cardiac arrest. The four links in this chain are: Early Recognition and Access to Emergency Care, Early CPR, Early Defibrillation and Early Advanced Cardiac Care.



First Link: Early Recognition and Access

Early recognition and access to emergency care refers to shortening the time interval from onset of cardiac symptoms or collapse to arrival of a trained emergency care team. It includes:

- recognition of early warning signs of a heart attack e.g. chest pain, sweatiness, shortness of breath, nausea or vomiting.
- rapid call for an emergency ambulance
(In Singapore, the Emergency Ambulance number is 995)
- allowing ambulances priority on the roads so that they can reach the casualty quickly.
- allowing paramedics rapid access and priority in use of elevators in high-rise buildings.

Early access is crucial because cardiac arrest is a time-critical illness. If nothing is done for the casualty, for every passing minute, the casualty chances of living decreases.

Second Link: Early CPR

The brain starts dying within minutes when the heart stops pumping. CPR needs to be initiated as soon as possible to provide oxygen and blood flow to the brain and heart and remove excess carbon dioxide from the lungs. CPR cannot always restart the heart. It can however buy the valuable time needed to keep the vital organs alive until definitive help arrives.

CPR, whether done by bystanders or healthcare workers, increases the chances of life. Often, CPR may not be done by a member of the public for fear of causing harm, the bystander not being sure of what to do and fear of legal action if the casualty does not survive. CPR does not cause any harm. The alternative, i.e. not doing CPR, is certain death. Doing CPR does not guarantee survival. It simply provides a chance at life. It is easy to do. There are no adverse legal consequences if a rescuer, with good intention, attempts CPR.

Third Link: Early Defibrillation

This procedure can frequently re-start the heart if carried out early. Studies have shown that early defibrillation is most likely to improve survival rates for out-of-hospital cardiac arrest casualties. Every emergency vehicle transporting cardiac arrest patients should be equipped with a defibrillator. Defibrillation works best in the first few minutes after the onset of cardiac arrest. If initiated too late, the heart will not respond to electrical therapy. For every minute of delay in delivering defibrillation, the survival rate decreases by 7 to 10%.

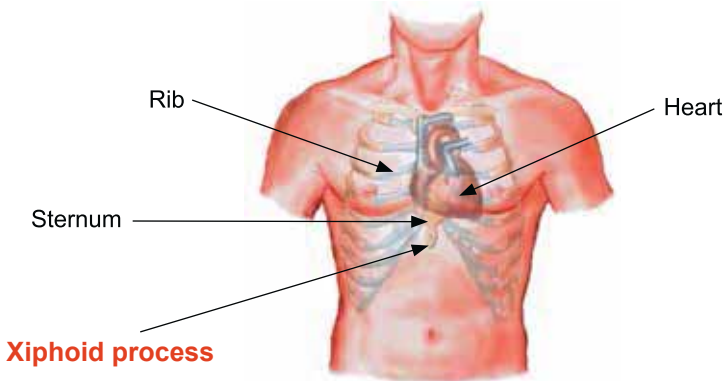
Fourth Link: Early Advanced Care

Advanced Cardiac Life Support stabilises the resuscitated casualty condition in the most critical phase. It consists of advanced airway management and administration of medication and is frequently carried out in the hospital environment.

THE HEART

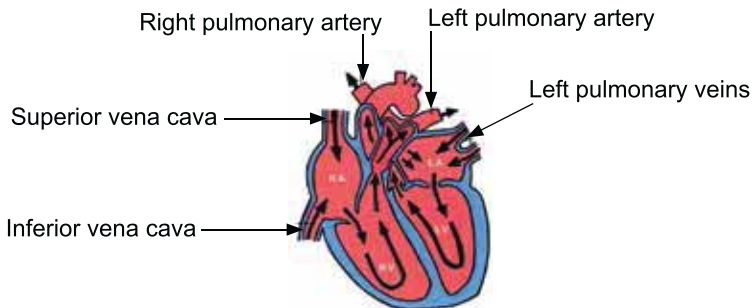
ANATOMY & FUNCTION

The heart is a hollow, conical, muscular organ situated in the centre of the chest between the lungs and behind the sternum (breastbone). It is about the size of a clenched fist.



The Heart in Relation to the Chest

It receives blood depleted of oxygen from all parts of the body and pumps it to the lungs. There oxygen is taken up and the oxygen-enriched blood returns to the heart to be distributed to all parts of the body. The coronary arteries are blood vessels that send oxygen-rich blood to the muscles of the heart.



The Heart as a Pump

HEART ATTACK

Heart attack usually occurs when a blood clot suddenly and completely blocks an already diseased coronary artery. Coronary artery disease is the end-result of a gradual build-up of fatty deposits (cholesterol plaques) and blood cells in the inner lining of the coronary arterial wall, a process also known as “atherosclerosis”. Over a period of years, this leads to gradual narrowing of the lumen of the vessel, thereby reducing blood flow to heart muscle. Occasionally, the surface of a plaque may split or crack, and attract blood clots, which then causes complete obstruction of the lumen, resulting in “heart attack”.



The lumen of the artery becomes progressively narrower

Coronary Artery

Symptoms of Heart Attack

How to recognize a Heart Attack?

- ☞ Chest discomfort or pain is the commonest symptom.
- ☞ It usually has the following characteristics:
 - uncomfortable pressure, squeezing, fullness, tightness, or pain
 - usually located at the centre of the chest behind the breastbone
 - may spread to either the shoulder, neck, lower jaw, or either arm and occasionally to the upper abdomen
 - usually lasts longer than 20 minutes
- ☞ Other symptoms may include any or all of the following:
 - sweating
 - nausea
 - shortness of breath
 - weakness

- Symptoms may occur suddenly and may not be typical, so some casualties may not realise that they are having a heart attack. They may also think that the problem is due to indigestion.



If you meet anyone with these symptoms, dial 995 for an emergency ambulance for immediate transportation to the nearest emergency medical facility

Common Causes Of Sudden Death

- Heart Attack
- Foreign Body Airway Obstruction
- Drowning
- Stroke
- Drug Overdose
- Suffocation
- Smoke Inhalation
- Electrocution
- Severe Allergic Reactions
- Severe Trauma

Many of these deaths can be prevented if the casualties get prompt help – if someone trained provides life-saving CPR until other medical expertise takes over.

RISK FACTORS OF HEART ATTACK

There are a number of well-recognised risk factors for heart attack. Most risk factors can be modified to decrease the chance of heart attack. The more risk factors are present, the greater the risk of having a heart attack.

Major risk factors that cannot be changed:

- Heredity
- Increasing age



Major risk factors that can be changed:

- Cigarette smoking
- High blood pressure
- High blood cholesterol levels or triglyceride levels
- Diabetes mellitus



Other risk factors which can also be modified:

- Obesity
- Physical inactivity
- Stress



PRUDENT HEART LIVING

Prudent heart living includes adopting a lifestyle to help minimise the risk of a future heart attack. Reducing risk factors lowers the chance of having a heart attack or stroke.

- Control high blood pressure – treatment generally includes dietary change and medication. Take medication regularly if prescribed by your doctor.
- Quit smoking completely.



- Eat wisely – reduce saturated fat and cholesterol in the diet. Eat a well balanced diet.



- Reduce weight if you are overweight – count calories in your food intake.
- Exercise regularly – exercise tones the muscles, stimulates blood circulation, helps avoid excess weight gain and promotes a general feeling of well being.



**ADULT
CARDIO-PULMONARY
RESUSCITATION (CPR)**

DEFINITION

Cardio-Pulmonary Resuscitation (CPR) includes a series of assessments and interventions that support cardiac and pulmonary functions. When cardiac arrest occurs, the heart stops beating and circulation ceases. Unless the circulation is restarted quickly, organ death will begin to occur. The most sensitive organ is the brain and if circulation to the brain is not restarted within **4 to 6 minutes**, permanent and irreversible damage can occur. It is therefore important to start CPR as quickly as possible.

Air contains approximately 21% oxygen at sea level. During its passage through the body, only about 5% of the oxygen is utilised and hence exhaled air contains approximately 16% oxygen. When mouth-to-mouth ventilation is done during CPR, there is just sufficient oxygen in the exhaled air to keep the casualty alive. Chest compression squeezes the heart between the breastbone and the spine and thereby helps to circulate the blood and deliver this oxygen to the vital organs, especially the brain, heart and kidneys.

If CPR is performed promptly and correctly:

- Heart function may be restored, and
- Circulation may be maintained until institution of other life support measures.

The next section takes you step-by-step through the procedures needed to perform CPR or Cardio-Pulmonary Resuscitation – the basic skill needed to save life in the event of cardiac arrest.

ADULT ONE MAN CPR

MNEMONIC: DRS ABC

D: CHECK FOR DANGER

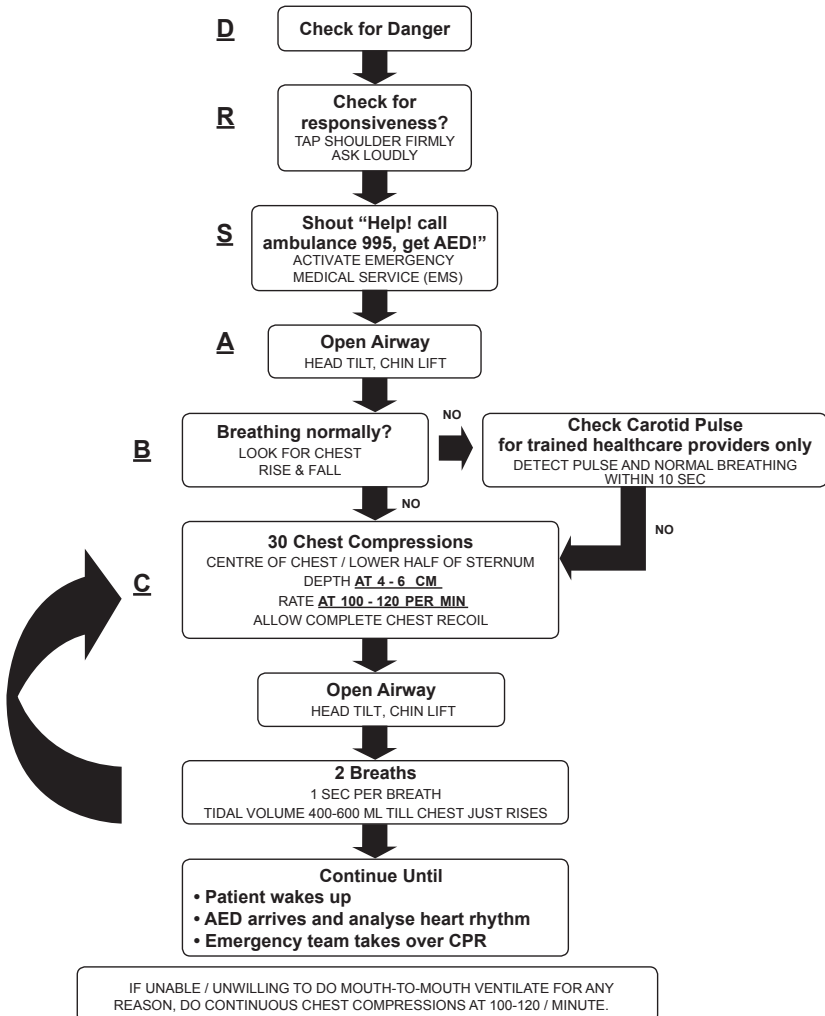
R: CHECK FOR RESPONSIVENESS

S: SHOUT FOR HELP

A: AIRWAY

B: BREATHING

C: CIRCULATION



STEP 1. CHECK FOR DANGER

- Quickly assess the situation for danger, so that the rescuer operates in a safe environment.

STEP 2. CHECK FOR RESPONSIVENESS

Quickly assess and determine whether the casualty is responsive. The rescuer should tap firmly or gently shake the casualty on the shoulders and asks loudly: "Hello! Hello! Are you OK?"



- Avoid violent shaking of the casualty as this might result in injury.
- Avoid unnecessary movements of the neck in the event of injuries to the head and neck.
- If the casualty does not respond, he/she is likely to be unconscious. This may be due to:
 - ⊙ An airway that is obstructed (blocked) by the tongue that has fallen backwards, food or secretions.
 - ⊙ Breathing that has stopped.
 - ⊙ The heart that has stopped beating, usually because of a heart attack.
- If the adult is unconscious, the rescuer will have to act quickly.

STEP 3. ACTIVATE EMERGENCY MEDICAL SERVICE (EMS)

- If the casualty does not respond, shout loudly, saying “Help! Call ambulance 995. Get AED”



- The rescuer should activate the Emergency Medical System (EMS) as soon as he/she has determined that an adult casualty is unconscious and requires emergency care.
- If there is another person around, ask him/her to call ambulance 995 & get AED.
- When calling the EMS, state:
 - Location of casualty.
 - The telephone number you are calling from.
 - What happened (e.g. that someone is having a heart attack or is unconscious).
 - Number of casualties.
 - Immediate ambulance/s required.
 - Hang up only after instructed to do so by the dispatcher.

STEP 4. POSITION THE Casualty

- For CPR to be effective, the casualty must be lying on his/her back on a firm, flat surface. If the casualty is lying face down, or on his/her side, the rescuer will need to roll the casualty over onto his/her back. Do take care that the head, neck and body are supported and turned simultaneously during repositioning, to avoid aggravating any potential cervical spine injury.



STEP 5. OPEN THE AIRWAY

- Perform head tilt-chin lift manoeuvre to open the airway. In the unresponsive casualty, muscle tone is impaired resulting in the tongue falling back and obstructing the airway. As the tongue is attached to the lower jaw, moving the lower jaw forward will lift the tongue away from the back of the throat and open the airway.



To perform head tilt-chin lift manoeuvre:

- Place one hand on the casualty forehead and the fingers of the other hand under the bony part of the lower jaw.
- Apply firm backward pressure with your palm on the casualty forehead to tilt the head back and lift the jaw forward simultaneously to open the airway.

Note:

- (a) Do not press deeply into the soft tissues under the chin because this might obstruct the airway.
- (b) Perform jaw thrust or gentle chin lift if head or neck injury is suspected.

STEP 6. CHECK FOR NORMAL BREATHING

- Place your ear and cheek over the casualty mouth and nose and assess for normal breathing

Check for breathing

- **Look** for the chest rise and fall.
- It is important to recognize that gasping is not normal breathing but a sign of cardiac arrest. Begin CPR immediately.



STEP 7. ASSESS FOR PULSE (for trained healthcare providers only, for layperson go straight to Step 8)

- Maintain head tilt with one hand, locate the Adam's apple or centre of the casualty throat with the index and middle fingers of your other hand.
- Slide your fingers down into the groove at the side of the neck near you (this is the location of the carotid pulse).
- Apply gentle pressure and feel for the pulse.
- Check of breathing and pulse should not take more than 10 seconds.
- If the casualty has no pulse, commence chest compressions.
- If unsure about the presence of pulse, assume cardiac arrest and commence chest compressions.



STEP 8. LOCATE HAND POSITION FOR CHEST COMPRESSIONS

- Chest compressions consist of serial, rhythmic applications of pressure over the lower half of the sternum (breastbone). These compressions create blood flow to the vital organs (heart, brain and kidneys) by increasing the intra-thoracic (chest) pressure.
- Locate the correct hand position for chest compressions:
 - Place the heel of your hand on the lower half of the casualty sternum (breastbone).
 - Do not compress on the Xiphoid Process (refer to pictures)

Xiphoid Process →



STEP 9. PERFORM CHEST COMPRESSIONS

- Place the heel of the other hand on top of the hand on the sternum.



- Interlace the fingers of both hands and lift the fingers off the chest wall.
- Straighten both elbows and lock them in position.
- Position your shoulder directly over the casualty chest.
- Use your body weight to compress the casualty chest vertically downwards at 4-6 cm in depth, counting loudly as you compress:

1 and 2 and 3 and 4 and **5 and**
1 and 2 and 3 and 4 and **10 and**
1 and 2 and 3 and 4 and **15**
1 and 2 and 3 and 4 and **20**
1 and 2 and 3 and 4 and **25**
1 and 2 and 3 and 4 and **30.**

- Perform chest compressions at a rate of 100-120 per minute.
- The ratio of compressions to ventilations is 30 compressions : 2 breaths
- Perform 5 cycles of 30 compressions and 2 breaths within 2 minutes.

TIPS FOR PROPER CHEST COMPRESSIONS

- To give effective chest compressions, rescuer should “push hard and push fast” (depth of 4-6cm, rate of at 100-120 per minute).
- Locating the correct hand position for chest compressions should be done quickly.
- Make sure you allow the chest to be fully recoiled before starting the next compression.
- Do not lift the heel of your hand off the chest between each compression.

Step 10: MOUTH-TO-MOUTH BREATHING

- After 30 chest compressions, perform 2 breaths

To perform mouth-to-mouth-breathing:

- ⊙ Maintain head tilt-chin lift.
 - ⊙ Pinch the nose with your thumb and index finger to prevent air from escaping through the casualty nose.
 - ⊙ Seal your lips around the casualty mouth and give 2 breaths.
 - ⊙ Release the nose after each breath.
 - ⊙ The chest should rise with each breath.
 - ⊙ The duration for each breath is 1 second.
 - ⊙ Ventilation volume is between 400 to 600 ml of air.
 - ⊙ Allow lung deflation between each breath.
- Quickly proceed to do another cycle of chest compressions (5 cycles of 30 compressions: 2 breaths).

Note

- Too great a volume of air is likely to cause air to enter the stomach and result in stomach (gastric) distension.

STEP 11: RE-ASSESSMENT

FOR TRAINED-HEALTHCARE PROVIDER: RE-ASSESSMENT

- Check pulse after every 5 cycles of CPR 30:2.
- If pulse is absent or unsure about the presence of pulse, start chest compressions and perform 5 cycles of CPR (30:2).
- If pulse is present, check for breathing.
- If breathing is absent, perform rescue breathing at a rate of 12 breaths per minute (one breath every 5 seconds) by giving one breath and count **2-a-thousand, 3-a-thousand, 4-a-thousand, 5-a-thousand**. Repeat the sequence until you have completed a total of 12 breaths.
- If both the pulse and breathing are present, position the casualty in the recovery position.
- Continue to monitor the casualty pulse and breathing every 2 minutes as these can stop suddenly.

For LAYPERSON:

Continue performing CPR until help arrives or casualty starts moving.

Note:

If you are unable or unwilling to do mouth-to-mouth ventilations for any reason, please do continue chest compressions at the rate of 100-120 per minute. You may take up to 10 seconds of rest in between 100-120 continuous chest compressions if you are tired. This is better than no CPR at all, though a combination of compressions and ventilations at 30:2 appears to be the best.

ADULT TWO-MAN CPR

The adult two-man CPR occurs when another rescuer is available to initiate the CPR. One of the rescuers is to call 995 for activation of the emergency response system and get an AED (if available) once the casualty is found unresponsive. The other is to continue to check for breathing (and pulse for trained healthcare providers only) and to start on chest compressions when needed. In two-man CPR, one rescuer performs chest compressions and the other rescuer provides mouth-to-mouth breathing. The purpose of two-man CPR is to reduce rescuer fatigue and inadequate chest compressions. Significant fatigue and inadequate compression rates and depth are usually seen after two minutes of CPR. It is recommended that the rescuer should initiate the switch of roles for two-man CPR at every two minutes (or after 5 cycles of 30 compressions and 2 breaths).

Rescuer 1



Rescuer 2

GUIDELINES FOR PROPER CHEST COMPRESSIONS

DO'S

- Allow the chest to recoil completely after each compression.
- Use your body weight to perform the chest compressions.
- Keep your fingers off the chest wall.
- Compress at a rate of 100-120 per minute.

DON'T'S

- Do not lift the heel of your hands from the sternum (breastbone), otherwise correct hand position may be lost.
- Do not bounce or jerk during chest compressions as these movements may cause injuries and also decrease the effectiveness of CPR

ADULT RECOVERY POSITION

The recovery position is used in the management of casualty who are unresponsive but are breathing and have pulse. When an unresponsive casualty is lying supine (on the back with the face upwards), the airway may become obstructed by the tongue, mucus or vomitus. These problems may be prevented when the casualty is placed on his/her side as fluid can drain easily from the mouth.

If there is no evidence of trauma, place the casualty on his/her side in the recovery position. The recovery position keeps the airway open. The following steps are recommended:

STEP 1. POSITION THE CASUALTY

- A. Tuck the hand nearer to you, arm straight and palm upward under the casualty thigh.



- B. Bring the arm further from you across the casualty chest and place the back of his/her hand against his/her cheek.



- Put your palm against the casualty palm that is on the cheek and maintain this position.

- C. Using your other hand, bend the casualty far knee to a 90-degree angle, hold the casualty far hip and roll him/her towards you.



STEP 2. ROLL THE CASUALTY TOWARDS THE RESCUER



- Use your knees to support the casualty body as you turn him/her to prevent him/her from rolling too far forward.

STEP 3. FINAL RECOVERY POSITION

- Ensure that the casualty head (cheek) is lying on the back of his/her palm.
- Check that the casualty other hand is lying free alongside his/her body with palm facing upwards.
- The far leg should preferably be bent at the knee to a 90-degree angle.
- Stay with the casualty and check pulse and breathing every two minutes.



**ADULT
FOREIGN BODY AIRWAY
OBSTRUCTION (FBAO)**

INTRODUCTION

Complete airway obstruction is an emergency that will result in death within minutes, if not treated immediately. A casualty can develop airway obstruction from either intrinsic (tongue and epiglottitis) or extrinsic (foreign body) causes.

Intrinsic Causes

- The tongue falls backward into the pharynx in an unconscious casualty.
- Blood from head and facial injuries flow into the airway.
- Regurgitated stomach contents enter the airway.

Extrinsic Causes

- Foreign bodies, e.g. food, dentures etc.

Contributing Factors

1. Large, poorly chewed pieces of meat/food
2. Elevated blood alcohol levels
3. Dentures
4. Playing, crying, laughing, and talking with food in the mouth

Precautions

1. Cut food into small pieces. Chew slowly and thoroughly, especially if wearing dentures.
2. Avoid excessive intake of alcohol.
3. Avoid laughing and talking when the mouth is full.

Recognition

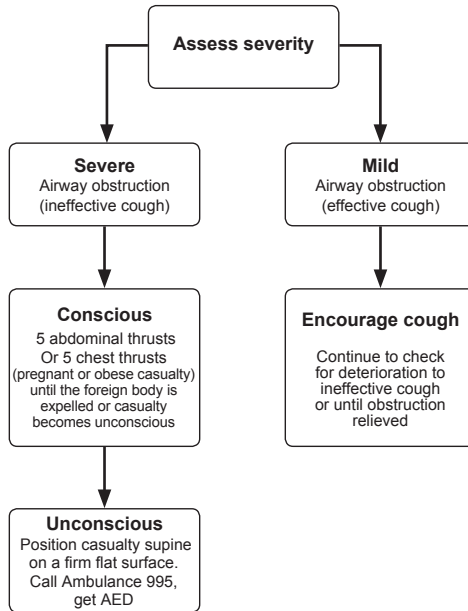
Foreign Body Airway Obstruction (FBAO) can be either partial or complete airway obstruction. Coughing is the body's natural defence against airway obstruction.

A casualty with partial (mild) airway obstruction will cough in an attempt to expel the foreign body. If the casualty is wheezing (breathing noisily with a wheezing sound) or coughing, this means that the airway is partially obstructed. Do not interfere. Allow the casualty to cough to expel the object himself/herself.

In complete airway obstruction, the casualty is unable to **speak, breathe or cough** and may become cyanotic (blue). The casualty will clutch the neck with the thumb and fingers, the universal distress signal for choking that requires immediate action.



Universal Choking sign



Relief of Adult Foreign Body Airway Obstruction

Techniques used to relieve FBAO include the Heimlich Manoeuvre (abdominal thrusts) and chest thrusts for pregnant and obese casualties.

The Heimlich Manoeuvre, also known as the subdiaphragmatic abdominal thrusts or abdominal thrusts is recommended for the relief of FBAO in responsive adults (more than 8 years of age) and children (1 to 8 years of age). The Heimlich Manoeuvre elevates the diaphragm and increase airway pressure, which force air out from the lungs. This creates an artificial cough and expels the foreign body from the airway.

In obese or pregnant casualty, chest thrusts should be used instead of abdominal thrusts.

Complications from Heimlich Manoeuvre

If performed incorrectly, it may damage the internal organs resulting in rupture or laceration of abdominal or thoracic viscera.

STEPS FOR RELIEF OF CONSCIOUS ADULT (FBAO)

STEP 1. ASSESS WHETHER CASUALTY IS CHOKING

Ask: "Are you choking?" If the casualty is choking, the casualty will not be able to speak, breathe or cough but may nod his/her head. Tell the casualty that you can help.



Note:

- If the casualty is able to cough, instruct the casualty to cough as hard as possible. If coughing does not relieve the airway obstruction, perform the Heimlich Manoeuvre.

STEP 2. POSITION OF RESCUER

- If the casualty is standing, the rescuer stands behind the casualty.
- If the casualty is sitting, the rescuer kneels down and positions himself/herself behind the casualty.

STEP 3. LOCATION OF LANDMARK

- Put your arms around the casualty abdomen.
- Locate the navel.
- Place 2 fingers above the navel and well below the tip of the xiphoid process.
- Make a fist with the other hand with the thumb hidden in the palm.
- Place the thumb side of the fist against the casualty abdomen, midline and above the 2 fingers' spacing.



STEP 4. HEIMLICH MANOEUVRE

- Lean the casualty forward with one hand, while maintaining the fist against the abdomen.



- Grasp your fist with your other hand.
- Give quick inward and upward thrusts in one motion into the casualty abdomen.
- Deliver each thrust firmly and distinctly with the intent of relieving the obstruction until the foreign body is expelled or the casualty becomes unconscious.



Note:

- Usually, this procedure will force the foreign object out of the throat and the airway obstruction will be relieved.

THE SELF-ADMINISTERED HEIMLICH MANOEUVRE

- To treat one's own complete FBAO, the casualty makes a fist with one hand, places the thumb-side on the abdomen above the navel (2 fingers' breadth) and below the xiphoid process. Grasps the fist with the other hand, and then presses inward and upward toward the diaphragm with a quick motion.
- If unsuccessful, the casualty can also press the upper abdomen over any firm surface such as the back of a chair, side of a table or porch railing. Several thrusts may be needed to clear the airway.

RELIEF OF CONSCIOUS ADULT FBAO USING CHEST THRUST

This technique is used as an alternative for obese or pregnant casualty.

STEP 1. ASSESSMENT

- Ask: "Are you choking?" If the casualty is choking, the casualty will not be able to speak, breathe or cough but may nod his/her head. Tell the casualty that you can help.



STEP 2. POSITION OF RESCUER

- If the casualty is standing, the rescuer stands behind the casualty.
- If the casualty is sitting, the rescuer kneels down and positions himself/herself behind the casualty.

STEP 3. LOCATION OF LANDMARK

- Place your arms under the casualty armpits, encircling the chest.



- Make a fist with one hand with the thumb hidden in the palm.
- Place thumb-side of fist on the middle of the casualty's sternum (breastbone).



STEP 4. CHEST THRUSTS

- Grasp your fist with your other hand and give quick backward thrusts.
- Deliver each thrust firmly and distinctly with the intent of relieving the obstruction until the foreign body is expelled or the casualty becomes unconscious.



STEPS FOR RELIEF OF UNCONSCIOUS ADULT FBAO

If the casualty becomes unconscious, proceed with the following steps.

STEP 1. CHECK FOR DANGER

STEP 2. POSITION THE CASUALTY

- Support and position the casualty lying on his/her back on a firm flat surface.



STEP 3. ACTIVATE THE EMERGENCY MEDICAL SERVICE (EMS)

- Rescuer shouts: "Help! Call ambulance '995'."



STEP 4. START 30 CHEST COMPRESSIONS

- The hand position for chest compression is the same as for adult CPR. (Ref Pg 17-19, Step 8-9)



STEP 5. OPEN THE AIRWAY

- Perform head tilt-chin lift to open the airway.
- While maintaining head tilt, open the mouth gently to check for visible foreign bodies.

- Use a hooked index finger to dislodge the foreign body and manoeuvre it out of the mouth. Take precaution not to force the foreign body deeper into the throat. This manoeuvre is known as the **finger sweep**.



Note:

- Do not perform blind finger sweep. Blind finger sweep may push the object back or further into the airway.

STEP 6. BREATHING

- Check for presence of spontaneous breathing:
 - Look for the chest rise and fall.



STEP 7. MOUTH-TO-MOUTH BREATHING

- If there is no spontaneous breathing, attempt one ventilation by performing mouth-to-mouth breathing (1st ventilation).
- If there is resistance (chest does not rise), this indicates that the airway could be blocked. **Reposition** the casualty head with head tilt, chin lift procedure. Re-attempt to ventilate (2nd ventilation).



STEP 8. CHEST COMPRESSIONS

- If there is resistance (chest does not rise) again, perform 30 chest compressions using the same location and technique used for chest compressions in CPR (refer Pages 17 to 19, Steps 8 to 9).
- Proceed back to head tilt, chin lift and check for foreign body.
- Repeat Steps 4 to 7 until help arrives or able to give 2 successful ventilation.

STEP 9. ASSESS CASUALTY

- Assess the casualty for pulse & breathing once airway is cleared.
- If pulse (for healthcare providers only) & breathing are absent, assume cardiac arrest, start CPR.

**CHILD
CARDIO-PULMONARY
RESUSCITATION (CPR)**

INTRODUCTION

This module addresses children from 1 to 8 years of age.

Children in this age group rarely collapse due to a primary heart problem. Cardiac arrest is usually secondary to other events, such as major trauma or respiratory illness. Therefore, rescuers must detect and promptly treat early signs of respiratory and circulatory failure to prevent cardiac arrest.

Note:

- For a child above the age of 8 years or of a large size but below 8 years old, chest compressions can be accomplished with adult CPR.

STEPS FOR CHILD CARDIO PULMONARY RESUSCITATION (CPR)

STEP 1. CHECK FOR DANGER

- Quickly assess the situation for danger, so that the rescuer operates in a safe environment.

STEP 2. CHECK FOR RESPONSIVENESS

- Quickly assess and determine whether the child is responsive. The rescuer should tap or gently shake the child on the shoulders and asks loudly: "Hello! Hello! Are you OK?"



- Avoid violent shaking of the child as this might result in injury.
- Avoid unnecessary movements of the neck to prevent injuries to the head and neck.
- If the child does not respond, he/she is likely to be unconscious. This may be due to:
 - ⊙ An airway that is obstructed (blocked) by the tongue that has fallen backwards, food or secretions.
 - ⊙ Breathing that has stopped.
 - ⊙ The heart that has stopped beating, usually because of respiratory/breathing problems.
 - ⊙ If the child is unconscious, you will have to act quickly.

STEP 3: ACTIVATE EMERGENCY MEDICAL SERVICE (EMS)

- If the child does not respond, shout loudly for help and immediately call "995" for an emergency ambulance.
- Get AED if visible and within 100 metres.



- When calling the EMS, state:
 - Location of the child.
 - The telephone number you are calling from.
 - What happened (e.g. that a child is unconscious).
 - Number of casualties.
 - Immediate ambulance/s required.
 - Hang up only after instructed to do so by the dispatcher.

STEP 4.POSITION THE CHILD

- For CPR to be effective, the child must be lying on his/her back and on a firm, flat surface. If the child is lying face down or on his/her side, the rescuer will need to roll the child over onto his/her back. Do take care that the head, neck and body are supported and turned simultaneously during repositioning.

STEP 5. OPEN THE AIRWAY

- Perform head tilt-chin lift manoeuvre to open the airway. In the unresponsive child, muscle tone is impaired resulting in the tongue falling back and obstructing the airway. As the tongue is attached to the lower jaw, moving the lower jaw forward will lift the tongue away from the back of the throat and open the airway.

To perform head tilt-chin lift manoeuvre:

- Place one hand on the child's forehead and the fingers of the other hand under the bony part of the lower jaw.
- Apply firm backward pressure with your palm on the child's forehead to tilt the head back and lift the jaw forward simultaneously to open the airway.

Note:

- Do not press deeply into the soft tissues under the chin because this might obstruct the airway.
- Perform jaw thrust or gentle chin lift if head or neck injury is suspected.

STEP 6. CHECK FOR NORMAL BREATHING

- Look for the chest rise and fall.
- It is important to recognize that gasping is not normal breathing but a sign of cardiac arrest. Begin CPR immediately.



STEP 7. ASSESS FOR PULSE (FOR TRAINED HEALTHCARE PROVIDERS ONLY, FOR LAYPERSON GO STRAIGHT TO STEP 8)

- Maintain head tilt with one hand, locate the centre of the throat with the index and middle fingers of your other hand.
- Slide your fingers down into the groove at the side of the neck near to you (this is the location of the carotid pulse).
- Apply gentle pressure and feel for the carotid pulse.
- Checking of breathing and pulse should not take more than 10 seconds.



- If the child has no pulse, commence chest compressions.
- If unsure about the presence of pulse, assume cardiac arrest and commence chest compressions.

STEP 8. LOCATE HAND POSITION FOR CHEST COMPRESSIONS

- Chest compressions consist of a series of rhythmic applications of pressure over the lower half of the sternum (breastbone). These compressions create blood flow to the vital organs (heart, lungs and brain) by increasing intra-thoracic (chest) pressure.
- Locate the correct hand position for chest compressions:
 - Ensure adequate exposure to the chest and start chest compression over lower half of the sternum (breastbone).
 - Place the heel of one hand on the lower half of the sternum (breastbone).



* Do not compress on the Xiphoid Process (refer to picture on page 17)

STEP 9. PERFORM CHEST COMPRESSIONS

- Place the heel of the other hand on top of the hand on the sternum.
- Interlace the fingers of both hands and lift the fingers off the chest wall.
- Straighten both elbows and lock them in position.



- Position your shoulder directly over the child's chest.
- Use your body weight to compress the child's chest by about 4 to 5 cm in depth, counting loudly as you compress:

1 and 2 and 3 and 4 and **5 and**
1 and 2 and 3 and 4 and **10 and**
1 and 2 and 3 and 4 and **15**
1 and 2 and 3 and 4 and **20**
1 and 2 and 3 and 4 and **25**
1 and 2 and 3 and 4 and **30.**

- Perform chest compressions at a rate of at least 100 to 120 per minute..
- The ratio of compressions to ventilations is 30 compressions: 2 breaths.
- Perform 5 cycles of 30 compressions and 2 breaths within 2 minutes.

TIPS FOR PROPER CHEST COMPRESSIONS

- To give effective chest compressions, rescuer should “push hard and push fast”.
- Locating the correct hand position for chest compressions should be done quickly.
- Make sure you allow the chest to be fully recoiled before starting the next compression.
- Do not lift the heel of your hand off the chest between each compression.

STEP 10. MOUTH-TO-MOUTH BREATHING

- After 30 chest compressions, perform 2 breaths.

To perform mouth-to-mouth breathing:

- Maintain head tilt-chin lift.
- Pinch the nose with your thumb and index finger to prevent air from escaping through the child's nose.
- Seal your lips around the child's mouth and give 2 breaths.



- Release the nostrils after each breath.
- The chest should rise with each breath.
- The duration for each breath is 1 second. Allow lung deflation between each breath.



Note:

- Too great a volume of air is likely to cause air to enter the stomach and result in stomach (gastric) distension.

STEP 11. RE-ASSESSMENT

For trained healthcare provider:

- Check for normal breathing and pulse after every 5 cycles of CPR 30:2.
- If pulse is absent or unsure about the presence of pulse, continue CPR 30:2
- If pulse is present and the child is not breathing, perform rescue breathing at 20 times per minute (one breath every 3 seconds) by giving one breath and count "2-a-thousand, 3-a-thousand". Repeat the sequence until you have completed a total of 20 breaths.
- If both the pulse and breathing are present, position the child in the recovery position.
- Continue to monitor the child's pulse every few minutes as these can stop suddenly.



For layperson:

- Continue CPR until help arrives or casualty starts moving.

CHILD RECOVERY POSITION

The recovery position is used in the management of children who are unresponsive but are breathing and have pulse. When an unresponsive child is lying supine (on the back with face upwards), the airway may become obstructed by the tongue, mucus or vomitus. These problems may be prevented when the child is placed on his/her side as fluid can drain easily from the mouth.

If there is no evidence of trauma, place the child on his/her side in the recovery position. The recovery position keeps the airway open. The following steps are recommended:

STEP 1. POSITION THE CHILD

- Tuck the hand nearer to you; arm straight and palm upward under the child's thigh.
- Bring the arm further from you across the child's chest and place the back of his/her hand against his/her cheek.
- Put your palm against the child's palm that is on the cheek and maintain this position.
- Using your other hand, bend the child's far knee to a 90-degree angle, hold the child's far hip and roll him/her towards you.



STEP 2. ROLL THE CHILD TOWARDS THE RESCUER

- Use your knees to support the child's body as you turn him/her to prevent him/her from rolling too far forward.



STEP 3. FINAL RECOVERY POSITION

- Ensure that the child's head (cheek) is lying on the back of his/her palm.
- Check that the child's other hand is lying free alongside his/her body with palm facing upwards.
- The far leg should preferably be bent at the knee to a 90-degree angle.



- Stay with the child and check for pulse and breathing every 2 minutes.

**CHILD
FOREIGN BODY AIRWAY
OBSTRUCTION (FBAO)**

INTRODUCTION

Complete airway obstruction is an emergency that will result in death within minutes, if not treated immediately. The most common incidence of choking in children is during eating or playing.

Precautions

- Cut food into small pieces and instructing the child to chew slowly and thoroughly before swallowing.
- Discourage the child from talking or laughing when there is food in the mouth.
- Discourage the child from running or playing while eating.

Recognition

Foreign Body Airway Obstruction (FBAO) can be either partial or complete airway obstruction. Coughing is the body's natural defence against airway obstruction.

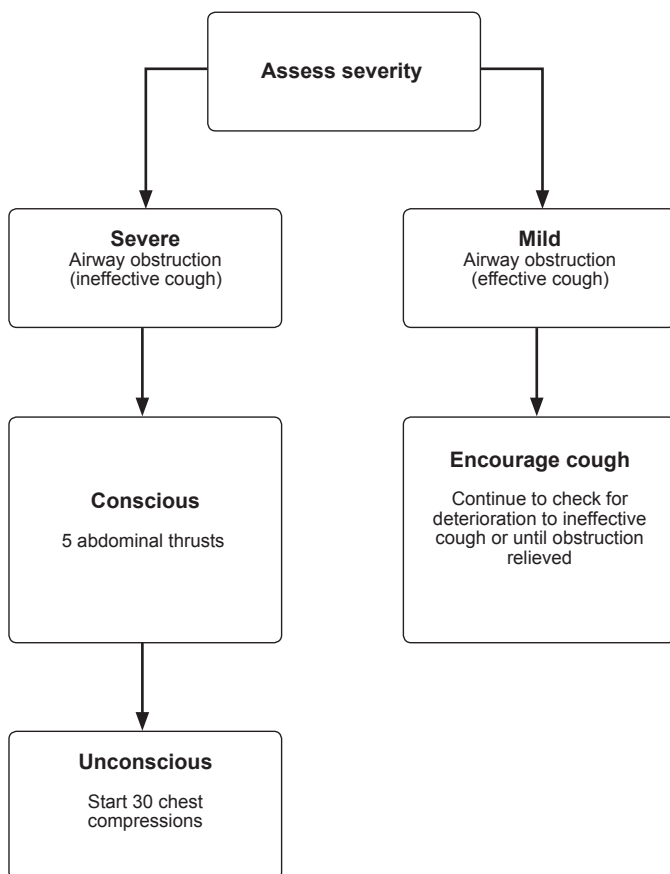
A child with partial airway obstruction will cough in an attempt to expel the foreign body. If the child is wheezing (breathing noisily with a wheezing sound) or coughing, this means that the airway is partially obstructed. Do not interfere. Instruct the child to cough to expel the object himself/herself.

In complete airway obstruction, the child is unable to (**speak, breathe or cough** and may become cyanotic (blue)). The child will clutch the neck with the thumb and fingers, the universal distress signal for choking that requires immediate action.

The technique used to relieve foreign body airway obstruction is the Heimlich Manoeuvre (abdominal thrusts).



Universal Choking sign



CONSCIOUS CHILD FBAO USING “HEIMLICH MANOEUVRE”(CPR)

STEP 1. ASSESSMENT

- Ask: “Are you choking?” If the child is choking, the child will not be able to speak, breathe or cough but may nod his/her head. Tell the child that you can help.



Note:

- If the child is able to cough, instruct the child to cough as hard as possible. If coughing does not relieve the airway obstruction, perform the Heimlich Manoeuvre.

STEP 2. POSITION OF RESCUER

- If the child is standing, the rescuer stands behind the child.
- If the child is sitting, the rescuer kneels down and positions himself/herself behind the child.

STEP 3. LOCATE THE LANDMARK

- Put your arms around the child’s abdomen.
- Locate the navel.
- Place 2 fingers above the navel and well below the tip of the xiphoid process.
- Make a fist with the other hand with the thumb in the palm.
- Place the thumb side of the fist against the child’s abdomen, midline and above the 2 fingers’ spacing.



STEP 4. HEIMLICH MANOEUVRE

- Lean the child forward with one hand, while maintaining the fist against the abdomen.



- Grasp your fist with your other hand.
- Give quick inward and upward thrusts in one motion into the child's abdomen.
- Deliver each thrust firmly and distinctly with the intent of relieving the obstruction until the foreign body is expelled or the child becomes unconscious.



Note:

- Usually, this procedure will force the foreign object out of the throat and the airway obstruction will be relieved.

RELIEF OF UNCONSCIOUS CHILD FBAO

If the child becomes unconscious, proceed with the following steps:

STEP 1. CHECK FOR DANGER

STEP 2. POSITION THE CHILD

- Support and position the child lying on his/her back on a firm flat surface.



STEP 3. ACTIVATE EMERGENCY MEDICAL SERVICE (EMS)

- Rescuer shouts: "Help! Call ambulance '995'." Get AED, If visible or within 100 metres.



STEP 4. START 30 CHEST COMPRESSIONS

- Locate the landmark and perform 30 chest compressions using the same location and techniques used for chest compressions in CPR

STEP 5. OPEN THE AIRWAY

- Perform head tilt-chin lift to open airway.
- While maintaining head tilt, open the mouth gently to check for visible foreign bodies.



- If foreign body is seen, maintain open airway with chin lift and insert the index finger of your other hand into the child's mouth along the inside of the cheek.
- Use a hooking action to dislodge the foreign body and manoeuvre it out of the mouth. Take precaution not to force the foreign body deeper into the throat. This manoeuvre is known as the finger sweep.



Note:

- Do not perform blind finger sweep. Blind finger sweep may push the object back or further into the airway.

STEP 6. BREATHING

- Check for presence of spontaneous breathing:
 - Look for the chest rise and fall.



STEP 7. MOUTH-TO-MOUTH BREATHING

- If there is no spontaneous breathing, attempt to ventilate by performing mouth-to-mouth breathing (1st ventilation).



- If there is resistance (chest does not rise), this indicates that the airway is blocked. Reposition the casualty head with head tilt, chin lift manoeuvre. Look for any object in the mouth and if found remove it. Re-attempt to ventilate (2nd ventilation).

STEP 8. CHEST COMPRESSIONS

- If there is resistance (chest does not rise) again, perform 30 chest compressions using the same location and technique used for chest compressions in CPR.



- Proceed back to head tilt, chin lift and check for foreign body.
- Repeat Steps 4 to 7 until help arrives and takes over or the child starts breathing, coughing, talking or moving.

**INFANT
CARDIO-PULMONARY
RESUSCITATION (CPR)**

INTRODUCTION

This module addresses infants up to 1 year of age.

Infants rarely collapse due to a primary heart problem. Cardiac arrest is usually secondary to other events, such as major trauma or respiratory illness. Therefore, rescuers must detect and promptly treat early signs of respiratory and circulatory failure to prevent cardiac arrest.

STEP 1. CHECK FOR DANGER

- Quickly assess the situation for danger, so that the rescuer operates in a safe environment.

STEP 2. ASSESS UNRESPONSIVENESS



- Tap the infant gently on his/her shoulder to elicit a response.
 - Avoid violent shaking of the infant as this may result in injury.
 - Avoid unnecessary movements of the neck to prevent injuries to the head and neck.
 - If the infant does not respond, he/she is likely to be unconscious.
-
- Unconsciousness may be due to:
 - An airway that is obstructed (blocked) by the tongue that has fallen backward, food or secretions.
 - Breathing that has stopped.
 - The heart that has stopped beating, usually because of respiratory/breathing problems.
 - If the infant is unconscious, you will have to act quickly.

STEP 3. ACTIVATE EMERGENCY MEDICAL SERVICE (EMS)

- If the infant is unresponsive, shout loudly for help and immediately call “995” for an emergency ambulance.
- Get AED if visible and within 100 meters.
- When calling the EMS, state:
 - Location of the infant.
 - The telephone number you are calling from.
 - What happened (e.g. that an infant is unconscious)
 - Number of casualties
 - Immediate ambulance/s required.
 - Hang up only after instructed to do so by the dispatcher.



STEP 4. POSITION THE INFANT

- For CPR to be effective, the child must be lying on his/her back and on a firm, flat surface. If the child is lying face down or on his/her side, the rescuer will need to roll the child over onto his/her back. Do take care that the head, neck and body are supported and turned simultaneously during repositioning.

STEP 5. OPEN THE AIRWAY

- Perform head tilt-chin lift manoeuvre to open the airway. In the unresponsive infant, muscle tone is impaired resulting in the tongue falling back and obstructing the airway. As the tongue is attached to the lower jaw, moving the lower jaw forward will lift the tongue away from the back of the throat and open the airway.

STEP 5. OPEN THE AIRWAY

- Perform head tilt-chin lift manoeuvre to open the airway. In the unresponsive infant, muscle tone is impaired resulting in the tongue falling back and obstructing the airway. As the tongue is attached to the lower jaw, moving the lower jaw forward will lift the tongue away from the back of the throat and open the airway.

To perform head tilt-chin lift manoeuvre:

- Place one hand on the infant's forehead and the fingers of the other hand under the bony part of the lower jaw.
- Apply gentle backward pressure with your palm on the infant's forehead to tilt the head back gently and lift the jaw forward simultaneously to open the airway.
- Do not overextend the infant's neck.



Note:

- Do not press deeply into the soft tissues under the chin because this might obstruct the airway.
- Perform jaw thrust or gentle chin lift if head or neck injury is suspected.

STEP 6. CHECK FOR BREATHING

- Look for the chest rise and fall.
- It is important to recognize that gasping is not normal breathing but a sign of cardiac arrest - begin CPR immediately.

STEP 7. ASSESS FOR brachial PULSE (for trained healthcare providers only, for layperson go straight to Step 8)

- Maintaining head tilt with one hand, locate the brachial pulse (inner aspect of the upper arm, between the infant's elbow and shoulder) with the index and middle fingers of your other hand.
- Apply gentle pressure and feel for the pulse.
- Checking of breathing and pulse should not take more than 10 seconds.
- If the infant has no pulse, commence chest compressions.
- If unsure about the presence of pulse, assume cardiac arrest and commence chest compressions.



STEP 8. LOCATE HAND POSITION FOR CHEST COMPRESSIONS

- Chest compressions consist of serial, rhythmic applications of pressure over the lower half of the sternum (breastbone). These compressions create blood flow to the vital organs (heart, brain and kidneys) by increasing the intra-thoracic (chest) pressure.
- Locating the correct hand position for chest compressions:

- While maintaining head tilt with one hand, draw an imaginary line between the nipples with the index finger of your other hand.



- At the sternum (breastbone), place your middle (third) and ring (fourth) fingers next to your index finger.
- Move the 3 fingers to the centre of the sternum



- Position the fingers upright.
- Lift up your index finger but maintain the middle and ring fingers on the sternum and commence chest compressions.



STEP 9. PERFORM CHEST COMPRESSIONS

- Compress the infant's chest (lower sternum) downwards by 3-4cm depth or 1/3 the anterior - posterior diameter, counting loudly as you compress:

1 and 2 and 3 and 4 and **5 and**
1 and 2 and 3 and 4 and **10 and**
1 and 2 and 3 and 4 and **15**
1 and 2 and 3 and 4 and **20**
1 and 2 and 3 and 4 and **25**
1 and 2 and 3 and 4 and **30**



- Perform chest compressions at a rate of 100-120 per minute.
- The ratio of compressions to ventilations is 30 compressions : 2 breaths.
- Perform 5 cycles of 30 compressions and 2 breaths within 2 minutes.

TIPS FOR PROPER CHEST COMPRESSIONS

- Locate the correct hand position for chest compressions should be done quickly.
- Make sure you allow the chest to be fully recoiled before starting the next compression.
- Do not lift the fingers off the chest between each compression.
- Keep your head low throughout (during upstrokes and breathing).

STEP 10. MOUTH-TO- MOUTH AND NOSE BREATHING

- After 30 chest compressions, perform 2 breaths.

To perform mouth-to-mouth breathing:

- Make a tight seal by placing your mouth over the infant's mouth and nose.
- Give 2 breaths into the infant's mouth and nose simultaneously
- The chest should rise with each breath.
- The duration for each breath is 1 second.
- Ventilation volume is 30ml of air.
- Allow lung deflation before each breath.

Note:

- Too great a volume of air is likely to cause air to enter the stomach and result in stomach (gastric) distension.



STEP 11. RE-ASSESSMENT

For trained healthcare provider:

- Check for normal breathing and the pulse after every 5 cycles of CPR 30:2.
- If pulse is absent or unsure about the presence of pulse, start chest compressions and perform 5 cycles of CPR (30:2).
- If pulse is present, breathing is absent, perform rescue breathing at a rate of 20 breaths per minute (one breath every 3 seconds) by giving one breath and count “2-a thousand, 3-a-thousand”.
- Repeat the sequence until you have completed a total of 20 breaths.
- If both pulse and breathing are present, turn the infant to the lateral position.
- Continue to monitor the infant’s pulse and breathing every 2 minutes as these can stop suddenly.

For layperson:

- Continue performing CPR until help arrives or casualty starts moving.

Note:

If you are unable or unwilling to do mouth-to-mouth ventilations for any reason, please do continue chest compressions at the rate of 100-120 per minute. You may take up to 10 seconds of rest in between 100 continuous chest compressions if you are tired. This is better than no CPR at all, though a combination of compressions and ventilations at 30:2 appears to be the best.

INFANT LATERAL POSITION

The lateral position (side position) is used in the management of infants who are unresponsive but are breathing and have pulse. When an unresponsive infant is lying supine (on the back with face upwards), the airway may become obstructed by the tongue, mucus or vomitus. These problems may be prevented when the infant is placed on his/her side as fluid can drain easily from the mouth.

If there is no evidence of trauma, place the infant on his/her side in the lateral position. The lateral position keeps the airway open. The following steps are recommended:

STEP 1. POSITION THE INFANT

- Place the infant's arms alongside body.
- Straighten the legs.

STEP 2. ROLL THE INFANT TOWARDS THE RESCUER

- Support infant's head and neck with one hand.
- Place the other hand on infant's hip.
- Gently roll or turn the infant as a unit towards you.
- Support the infant's back with a soft pillow/cushion.
- Ensure that the infant's head is not overextended or flexed.
- Stay with the infant and check pulse and breathing every 2 minutes.

**INFANT
FOREIGN BODY AIRWAY
OBSTRUCTION (FBAO)**

INTRODUCTION

Complete airway obstruction is an emergency that will result in death within minutes, if not treated immediately. The most common incidence of choking in an infant occurs during eating or playing.

In a witnessed choking event, the chances of survival will increase if the rescuer is able to intervene when the infant is still conscious. The obstructed airway of a conscious infant can be cleared using back blows and chest thrusts.

Precautions

- Do not 'force-feed' milk. Allow rest in between.
- Check teat of milk bottle prior to feeding. The size may be too large for the infant.
- Cut food into small pieces and feed the infant (if on a weaning diet) small spoonfuls each time.
- Discourage moving about (crawling) or playing while eating.

Recognition

- Choking develops very abruptly and is associated with coughing, gagging or stridor (a high pitched, noisy sound or wheezing).
- If the infant has an infection (e.g. fever, nasal congestion, voice hoarseness), suspect epiglottitis and croup.
- Bring the infant immediately to a hospital as the back blows and chest thrusts technique may not relieve the airway obstruction.

RELIEF OF CONSCIOUS INFANT FBAO

STEP 1. ASSESSMENT

- Infant is conscious and has stridor.
- If the obstruction is getting worse (complete airway obstruction), you will notice at least one of the following:
 - Loss of voice.
 - Increased breathing difficulty.
 - The infant's face may turn blue.



- Immediately attempt to relieve the airway obstruction.

STEP 2. BACK BLOWS AND CHEST THRUSTS TECHNIQUE

- Support the head of the infant with your palm and back of the infant's body on your forearm.
- "Sandwich" the infant with your other hand by:
 - Supporting the infant's jaw with your thumb on one side and the rest of your fingers on the other side. Place your forearm on the infant's chest.



- Support the infant's head and body as a unit.



- Straddle the infant face down with the head lower than the body.
- Stride one leg (same side as the forearm that is supporting the infant's chest) forward bending at the knee keeping the foot flat on the floor. Do not tip toe.
- Place the infant's head downwards with the forearm, which is supporting the infant's chest onto your thigh to support the infant.
- Deliver 5 back blows forcefully between the shoulder blades with the heel of your other hand.



- Place your free hand on the infant's back and head to resume the "sandwich" position.
- Turn the infant over with head lower than the body.
- Rest your forearm supporting the infant's back onto your thigh (on the same side) to support the infant.
- Draw an imaginary line between the nipples with the ring (fourth) finger.
- At the sternum (breastbone), place your middle and index fingers (third and second) next to your ring (fourth) finger.



- Lift up your ring (fourth) finger and deliver 5 chest thrusts over the lower half of the sternum (breastbone) using the same location and technique as chest compressions in CPR.
- If foreign body is seen, remove the foreign body with your little finger.
- Repeat Step 2 (Back Blows and Chest thrusts Techniques) until foreign body is expelled or infant becomes unconscious.
- Infants should NEVER be given abdominal thrusts (Heimlich manoeuvre).

Note:

- Do not tip toe when performing back blows and chest thrusts as the rescuer may accidentally trip and fall.
- Each back blow and chest thrust should be delivered with sufficient force and with the intention of expelling the foreign body.

OTHER OPTIONS OF SUPPORTING THE INFANT WITH FBAO:



Sitting on the chair



kneeling on the floor

RELIEF OF UNCONSCIOUS INFANT FBAO

If the infant becomes unconscious, proceed with the following steps.

STEP 1. CHECK FOR DANGER

STEP 2. POSITION THE INFANT

- Support and position the infant lying on his/her back on a firm flat surface.

STEP 3. ACTIVATE EMERGENCY MEDICAL SERVICE (EMS)

- Rescuer shouts: "Help! Call ambulance '995'."

STEP 4. START 30 CHEST COMPRESSIONS

- The hand position for chest compression is the same as for infant CPR (Refer Pg pg 60-61, Step 8-9).

STEP 5. OPEN THE AIRWAY

- Perform gentle head tilt-chin lift to open the airway.
- While maintaining head tilt, open the mouth gently to check for visible foreign bodies.
- If foreign body is seen, maintain open airway with chin lift and insert the little finger of your other hand into the infant's mouth along the inside of the cheek.
- Use the little finger in a hooking action to dislodge the foreign body and manoeuvre it out of the mouth. Take precaution not to force the foreign body deeper into the throat. This manoeuvre is known as the finger sweep.

Note:

- Do not perform blind finger sweep. Blind finger sweep may push the object back or further into the airway.

STEP 6. BREATHING

Check for presence of spontaneous breathing:

- **Look** for the chest rise and fall.

STEP 7. MOUTH-TO-MOUTH AND NOSE BREATHING

- If there is no spontaneous breathing, attempt to ventilate by performing mouth-to-mouth and nose breathing (1st ventilation).
- If there is resistance (chest does not rise), this indicates that the airway is blocked. Reposition the casualty head with head tilt, chin lift procedure. Re-attempt to ventilate (2nd ventilation).

STEP 8. CHEST COMPRESSIONS

- If there is still resistance (chest does not rise again), perform 30 chest compressions the same location and techniques used for chest compressions in CPR.
- Proceed back to head tilt, chin lift and check for foreign body.
- Repeat Steps 4 to 7 until help arrives.

STEP 9. ASSESS Casualty

- Assess the casualty for pulse & breathing once airway is cleared.
- If pulse (for healthcare providers only) & breathing are absent, assume cardiac arrest, start CPR.

SAFETY MEASURES IN CARDIO PULMONARY RESUSCITATION (CPR)

Safety Measures in Cardio-Pulmonary Resuscitation (CPR) Training Practices

Do's

- Perform hand hygiene before and after contact with manikins.
- Disinfect manikin's mouth and nose in between each participant (use alcohol 70%).
- Use disposable face shield when performing mouth-to-mouth ventilations.
- Female participants to:
 - inform chief instructor if you are pregnant.
 - remove lipstick before training session.
 - tie-up or bun-up long hair.
- Participants must inform the chief instructor on duty before the training begins if they:
 - have weeping dermatologic lesions on their hands, or in oral or circumoral areas.
 - are known to be seropositive for HBs Ag.
 - have known medical problems.
 - have fever, chills or body ache in the previous three days.
 - had been advised by any doctor not to exert themselves.
- Keep finger nails short to prevent leaving puncture marks on the manikins.
- Handle all manikins and training equipment with care.
- Decontaminate all used manikins' faces and change the disposable lungs after each training session.

Dont's

- Do not eat or drink during practical training hours to avoid contamination of manikins with food particles.
- Do not mark any area of the manikin.

Summary

SUMMARY 1: ONE-MAN ADULT CPR

1. Check for danger.
2. Check for responsiveness
 - Call, tap or shake the casualty firmly.
 - Shout: "Hello! Hello! Are you okay?"
3. If the casualty is unresponsive, activate EMS by dialling for an ambulance "995". Get AED if there is one nearby.
4. Position the casualty on a firm, flat surface.
5. Open the airway
 - Perform the head tilt-chin lift manoeuvre.
6. Check of breathing
 - Look for the rise and fall of the chest.
7. Check for normal breathing and pulse
(For trained healthcare providers only. For layperson, proceed to step 8).
 - While maintaining head tilt with one hand on the forehead, feel for the carotid pulse with the pulp of two fingers of the other hand while checking for breathing.
 - Checking of breathing and pulse should not take more than 10 seconds.
 - If unsure about the presence of pulse and no normal breathing, commence chest compressions.
8. Locate hand position for chest compressions
 - Place the heel of your hand on the lower half of the sternum.
 - Place the heel of the other hand on top of the hand on the sternum.
 - Interlace the fingers of both hands and lift the fingers off the chest wall.
9. Proper chest compression technique
 - Compress the sternum at the depth of 4 - 6 cm.
 - Say mnemonic [1 and 2 and 3 and 4 and **5** and 1 and 2 and 3 and 4 and **10** and 1 and 2 and 3 and 4 and **15**, 1 and 2 and 3 and 4 and **20**, 1 and 2 and 3 and 4 and **25**, 1 and 2 and 3 and 4 and **30**].
 - Chest compression rate of 100 - 120 per minute.

10. Mouth-to-mouth breathing

- Perform head-tilt, chin-lift and open the mouth gently.
- Give 2 breaths (1 second per breath; 400 to 600 ml of air per breath).
- Allow lung deflation between each breath.

11. Perform 5 cycles of 30 chest compressions followed by 2 breaths within 2 minutes.

12. Re-assessment

For trained healthcare provider:

- Assess pulse and breathing after 5 cycles of 30 chest compressions : 2 breaths.
- If breathing and pulse are absent or if you are unsure about its presence, start chest compressions and perform 5 cycles of CPR (30:2).
- If pulse is present and breathing is absent, perform rescue breathing (**Blow “2-a-thousand, 3-a-thousand, 4-a-thousand, s-a- thousand”**). Repeat the sequence until you have completed a total of 12 breaths.
- If both breathing and pulse are present, position casualty in the recovery position.
- Continue to check for breathing and pulse every 2 minutes.

For layperson:

Continue performing CPR until help arrives and takes over or casualty starts moving.

Note:

If you are unable or unwilling to do mouth-to-mouth ventilations for any reason, please do continue chest compressions at the rate of 100 - 120 per minute. You may take up to 10 seconds of rest in between 100 continuous chest compressions if you are tired. This is better than no CPR at all, though a combination of compressions and ventilations at 30:2 appears to be the best.

SUMMARY 2: ADULT FOREIGN BODY AIRWAY OBSTRUCTION (FBAO)

HEIMLICH MANOEUVRE

1. Assessment
 - Ask: "Are you choking?"
 - If casualty is confirmed choking, says: "I can help."
2. Position of rescuer
 - If the casualty is standing, the rescuer stands behind the casualty.
 - If the casualty is sitting, the rescuer kneels down and positions himself behind the casualty.
3. Locate the landmark
 - Place arms around the casualty abdomen and locate the navel.
 - Place 2 fingers above the navel and well below the tip of the xiphoid process.
 - Make a fist with the other hand.
 - Place the thumb-side of the fist against the casualty abdomen, midline and above the 2 fingers' spacing.
4. Heimlich Manoeuvre
 - Lean the casualty forward with one hand, while maintaining the fist against the abdomen.
 - Grasp the fist with the other hand.
 - Give successive inward and upward thrusts until the foreign body is expelled or the casualty becomes unconscious.

CHEST THRUST

This technique is used as an alternative for obese or pregnant casualty

1. Assessment
 - Ask: "Are you choking?"
 - Say: "I can help.", if casualty is confirmed choking.
2. Position of rescuer
 - If the casualty is standing, the rescuer stands behind the casualty.
 - If the casualty is sitting, the rescuer kneels down and positions himself behind the casualty.
3. Locate the landmark
 - Place arms under the casualty armpits, encircling the chest.
 - Make a fist with one hand.
 - Place the thumb-side of the fist against the middle of the casualty breastbone.

4. Chest thrust

- Grasp fist with the other hand and give quick backward thrusts.
- Deliver each thrust firmly with the intent of relieving the obstruction until the foreign body is expelled or the casualty becomes unconscious.

Relief of Unconscious Adult FBAO

If the casualty becomes unconscious, proceed with the following steps.

1. Check for danger

2. Position the casualty

- Support and position the casualty on the back.

3. Activate EMS by dialling ambulance number '995'.

- The hand position for chest compression is the same as for adult CPR.

4. Start 30 chest compressions

- The hand position for chest compression is the same as for adult CPR.

5. Open the airway

- Perform head tilt-chin lift manoeuvre.
- Open the mouth gently and check for visible foreign bodies (remove foreign body with a hooked index finger only if visible).

6. Assess breathing

- Check for breathing: Look, Listen and Feel (10 seconds).
- Place ear and cheek over the casualty mouth and nose and look for the chest rise and fall.
- Listen for air escaping during exhalation and feel for the flow of air.

7. Mouth-to-mouth breathing

- If there is no breathing, attempt to ventilate by performing mouth-to-mouth breathing.
- If the airway remains blocked, reposition casualty head and re-attempt to ventilate.

8. Chest compressions

- If the chest does not rise again, relieve obstruction by performing 30 chest compressions in the same manner as CPR.
- Repeat Steps 4 to 7 until help arrives.

9. Assess casualty

- Assess the casualty for pulse & breathing once airway is cleared.
- If pulse (for healthcare providers only) & breathing are absent, assume cardiac arrest, start CPR.

SUMMARY 3: DIFFERENCES BETWEEN CHILD AND ADULT ONE-MAN CPR

CPR Sequence	Adult and Older Child	Child (1-8 Years of Age)	Infant (Less than 1 Year of Age)
Establish Unresponsiveness Call ambulance 995, get AED	Immediately	Immediately	
Open Airway	Head Tilt – Chin Lift		
Recognition of Cardiac Arrest	Check for normal breathing (gasping is not normal breathing)		
Pulse Check (for Trained Healthcare Providers Only)	Carotid		Brachial
Start Chest Compressions	If no normal breathing or pulse check (by trained healthcare providers only) within 10 seconds		

Compression Landmarks	Lower half of sternum		Lower half of sternum (Just below intermammary line)
Compression Method	Heel of 1 hand, other on top		2 Fingers
Compression Depth	4-6 cm	4-5 cm	3-4cm
Compression Rate	100-120 / minutes		
Compression : Ventilation Ratio	30:2 (1 or 2 rescuers)		
Breathing	2 breaths at 1 second per breath. The two breaths should not interrupt chest compression for more than 6 sec		

SUMMARY 4: INFANT ONE-RESCUER CPR

1. Check for danger.
2. Check for responsiveness
 - Tap or shake the infant's shoulders firmly.
3. If the infant is unresponsive, activate EMS by dialling for an ambulance "995". Get AED if visible or within 100 metres.
4. Position the infant on a firm, flat surface.
5. Open the airway
 - Perform head tilt-chin-lift manoeuvre.
 - Do not over-extend the neck.
6. Check for normal breathing
 - Look for the rise and fall of the chest.
7. Check for normal breathing and pulse (For trained healthcare providers only)
 - While maintaining head tilt with one hand on the forehead, feel for brachial pulse with the pulp of two fingers of the other hand.
 - Checking of breathing and pulse should not take more than 10 seconds.
 - If unsure about the presence of pulse and no normal breathing, commence chest compressions.
8. Locate hand position for chest compressions
 - Place index finger on the infant's nipple.
 - Draw an imaginary line between the nipples.
 - Place middle and ring fingers next to the index finger.
 - Move the 3 fingers to the centre of the sternum (breastbone).
 - Position the fingers upright.
 - Lift up the index finger but maintain the middle and ring fingers on the sternum.
 - Compress the sternum.
9. Proper chest compression technique
 - Compress the sternum at the depth of 3 - 4 cm.
 - Say mnemonic [1 and 2 and 3 and 4 and 5 and 1 and 2 and 3 and 4 and 10 and 1 and 2 and 3 and 4 and 15, 1 and 2 and 3 and 4 and 20, 1 and 2 and 3 and 4 and 25, 1 and 2 and 3 and 4 and 30].
 - Chest compression rate of 100 - 120 per minute.
10. Mouth-to-mouth and nose breathing
 - Give 2 breaths (1 second and 30ml of air per breath).
 - Allow lung deflation between each breath.

11. Perform 5 cycles of 30 chest compressions, followed by 2 breaths within 2 minutes.
12. Re-assessment

For trained healthcare provider:

- Assess pulse and breathing after 5 cycles of 30 chest compressions : 2 breaths.
- If breathing and pulse are absent or if you are unsure about its presence, start chest compressions and perform 5 cycles of CPR (30:2).
- If pulse is present and breathing is absent, perform rescue breathing (**Blow “2-a-thousand, 3-a-thousand”**). Repeat the sequence until you have completed a total of 20 breaths.
- If both breathing and pulse are present, position infant in the lateral position. Continue to check for breathing and pulse every 2 minutes.

For layperson:

Continue performing CPR until help arrives and takes over or the infant starts moving

SUMMARY 5: INFANT FOREIGN BODY AIRWAY OBSTRUCTION

Relief of conscious Infant FBAO

1. Assessment

Rescuer recognises signs of choking.

- Conscious and has stridor
- Loss of voice
- Increased breathing difficulty
- Infant’s face may turn blue

2. Perform back blows and chest thrusts

5 Back Blows

- “Sandwich” infant between both hands and arms, supporting the head and neck.
- Straddle infant face down, head lower than the body over the rescuer’s forearm and supported on the rescuer’s thigh.
- Deliver 5 back blows forcefully between the shoulder blades with the heel of your other hand.

5 Chest Thrusts

- While supporting the head and neck, “sandwich” infant between the rescuer’s hands and arms, and turn the infant on his/her neck with head lower than the body.
- Deliver 5 chest thrusts in the same manner as for chest compressions.

3. Check infant's mouth for foreign body and remove any visible foreign body.

Repeat steps 2 to 4 until the foreign body is expelled or infant becomes unconscious.

Relief of Unconscious infant FBAO

If the infant becomes unconscious, proceed with the following steps:

1. Position the infant
 - Position the infant on his back on a firm flat surface, supporting head and neck.
2. Activate the EMS, dial for ambulance "995".
3. Start 30 chest compressions.
4. Open the airway
 - Perform the head tilt-chin lift manoeuvre.
 - Open the mouth gently and check for any visible foreign bodies (remove foreign body with a hooked little finger only if visible).
5. Check for breathing
 - Look for the rise and fall of the chest.
6. Mouth-to-mouth and nose breathing
 - If breathing is absent, attempt to ventilate by performing mouth-to-mouth and nose ventilations.
 - If airway remains blocked, reposition infant's head and re-attempt to ventilate.
7. Chest compressions
 - If the chest still does not rise, relieve obstruction by performing 30 chest compressions in the same manner as CPR.

Repeat steps 4 to 7 until help arrives and takes over or the infant starts breathing, coughing or moving.

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