

**Welcome to the trauma and emergency course. It is a 20 hours course involving classroom learning with an objective of equipping you with knowledge and skills to be able to initiate appropriate management following trauma and emergency situations. You are encouraged to attend classes, revise your notes and read your first aid manuals and medical surgical nursing textbooks so that you can understand the content better.**

**ATHANAS MWANGANGI KITHUA.**

### **Module Competence**

This module is designed to enable the learner promote safety, prevent accidents, diagnose and manage patients after trauma and accidents.

### **Module units**

1. First aid/Basic life support – 10hrs
2. Trauma and emergency – 10hrs

### **Module learning outcome**

By the end of this module, the learner should be able to: Initiate appropriate management following trauma and emergency situations.

### **Module content**

**First aid:** Definition and objective of first aid, principles and practice, organization, assessment of situation, prioritization, staff deployment, control of the situation, Transportation of casualty ( lifting, carrying, immobilization), methods of fire extinguishing, common emergencies (asphyxia, near drowning, wounds/hemorrhages, shock, convulsive disorders, fractures, injured ligaments and muscles, poisoning, bites, stings, burns and scolds, unconsciousness, foreign bodies, bandaging).

**Basic life support (BLS):** Assessment of signs of life (ABCD) and their management

**Trauma and emergency:** Types of emergencies, principles of trauma and emergency care (triaging, assessing using ABCD).

## **Definition and objective of first aid**

**Definition:** First aid is the Emergency care or treatment given to an ill or injured person before regular medical aid can be obtained (Merriam-Webster Dictionary).

It is the assistance given to any person suffering a sudden illness or injury, with care provided to preserve life, prevent the condition from worsening, and/or promote recovery. It includes initial intervention in a serious condition prior to professional medical help being available, such as performing Resuscitation (CPR) while awaiting an ambulance, as well as the complete treatment of minor conditions, such as applying a plaster to a fracture. First aid is generally performed by either laypersons or health care workers, with many lay people trained in providing basic levels of first aid, and others willing to do so from acquired knowledge.

## **Objectives:**

The following are the three objectives of first aid:

- To save somebody's life or preserve life
- To avoid more injury or prevent the condition from worsening
- To support healing or promote recovery.

The basic or elementary goal of providing first aid is to save life. You cannot always depend on a qualified health care provider to be present to save somebody's life. It is not possible for qualified health care provider to be around wherever anyone gets injured or in case of accidents. Therefore, someone who knows first aid can save your life. The basic requirement to stay alive is to breathe free. When somebody falls unconscious, or gets choked, it gets difficult for them to breathe free. In case of choking, the first aider will use techniques that include putting pressure on the abdomen or slapping the back to remove the cause of choking and clearing the passage for the air to move in and out freely. If the victim is unable to breathe even after the air passage has been cleared, the first aider might perform cardiopulmonary resuscitation or CPR. In this the first aider gives mouth-to-mouth breathing to the victim and massages his or her chest simultaneously in order to aid normal flow of blood throughout the body.

Secondly, first aid aims to avoid more injury and to stop a wound from getting worse. When you perform first aid on somebody, you are helping him out of some danger. It might be as simple as moving the victim away from where he or she got hurt. For instance, by covering a burning victim with a blanket in case of fire, it is providing first aid to the victim. Similarly, covering a wound with a cloth to control bleeding is also another form of first aid.

Last but not least is to provide help in healing. In some cases, first aid might be the treatment to an injury like putting a bandage to a small scratch, whereas, in some cases, it could be the first step to healing. People trained in first aid know how to manage any kind of situation from a small cut to a fracture, till the arrival of the medical team.

## **Principles and practice**

Common sense is an important part of providing first aid care. First aid, properly given can reduce the effects of injuries and medical emergencies. It can keep seriously ill or injured person alive and can make the difference between a short and long hospital stay. Therefore, proper first aid must be given quickly and effectively or the victim's condition may worsen with time.

In the excitement of an emergency, it is important to stop for a moment to clear your mind and think before you act. When responding to any emergency situation, remain calm and apply the four emergency action principles.

1. Survey the scene.
2. Conduct a primary survey of the victim.
3. Call the emergency medical service (EMS) or look for help.
4. Conduct a secondary survey of the victim when appropriate.

## **SURVEY THE SCENE**

In responding to an emergency situation, make a quick survey of the entire scene, look at the area around the victim, this should take only few seconds, then decide what to do next. Consider the following as you do your survey and don't forget the principle of DR.

### **Is the scene safe?**

You must remember that you cannot help a victim by becoming a victim yourself. You should know your abilities. However, if you cannot get a victim because of extreme hazards, such as fire, toxic fumes, heavy traffic, electrical wires or deep swift moving water call EMS or other services needed to handle the specific life-threatening hazard.

However, if you safely get to victim, decide if it is save to remain at the scene while you continue the steps of emergency action principle and care for the victim. If it is not safe, you may need to make an immediate emergency rescue.

### **What happened?**

If the victim is conscious, ask questions to what happened that caused the victim's illness or injury. If victim is unconscious, ask bystanders or look for clues, the scene itself often gives the answer.

### **How many people are injured?**

You should look beyond the victim you see at first glance. There may be other victims.

### **Are there bystanders who can help?**

If there are bystanders, use them to help you find out what happened. Although bystanders may not be trained in first aid, but they can help you in other important ways such as calling medical attention, by offering emotional support to the victim(s), their friends and their families and by keeping onlookers from crowding around the victim.

**D - Danger** – Always presume that there is some danger so check for and deal with any danger to yourself, the victim and bystanders e.g. traffic, electricity, infection from body fluid etc.

**R - Response** – Check for response by talking and asking the questions and shaking victim's shoulders gently.

### **Identify Yourself as First Aid Provider.**

Tell the victim and bystanders who you are and that you are trained in first aid, and this may help to reassure the victim, and also, it will help you to take charge of the situation. Quickly take in as much information as possible, and take into the consideration the principle of **DRABCD**.

**S - Shout** – The first aider must shout for help when there is no response and he is alone with the victim.

## **CONDUCT A PRIMARY SURVEY OF THE VICTIM**

The purpose of the primary survey is to check for the life threatening conditions and to give urgent first aid care.

**A - Airway** – Casualty must have a clear and unobstructed airway to be able to survive. Maintain an open airway by tilting the head back while placing two fingers to lift the chin. This head-tilt-chin position must be maintained to ensure the casualty airway remain open.

**B - Breathing** – check for up to 10 seconds for breathing, if breathing but unconscious place in the recovery position, this will help to maintain an open airway but if not breathing, start chest compressions alternating with rescue breaths at once.

**C - Circulation** – Check pulse and if the pulse is present, check blood pressure and temperature.

## **MAKING THE EMERGENCY CALL**

Make the call to emergency medical service provider or a health facility yourself or give the responsibility to a bystander. Make sure that adequate and precise information is passed on to the medics.

**This includes:**

1. The location of the emergency (exact address, city or town, location, landmark name of the building, floor, apartment or room number).
2. The telephone number of the phone being used.
3. The caller's name.
4. What happened.
5. Number of victims.
6. The victim's condition.
7. The help being given.

### **CONDUCT A SECONDARY SURVEY OF THE VICTIM**

The purpose of a secondary survey is to check the victim carefully and in an orderly way for injuries or other problems that are not an immediate threat to life but which could cause problems if not corrected. For example a fracture, open cut which is bleeding, etc.

### **ORGANIZATION OF ACCIDENT AND EMERGENCY UNIT**

An area in the health facility is normally designated as Accident and Emergency Department/Unit (A&E) or Casualty department. The A&E department/unit operates a 24-hour service and provides initial treatment for a broad spectrum of illnesses and injuries, which may be life threatening and require immediate attention. Financial considerations are not normally a barrier to the initial treatment of the patient. The A&E shall serve as a specialised care department, equipped and staffed to provide rapid and varied emergency care to all people with life-threatening conditions. The A&E provides initial appropriate care and arranges subsequent care either within the health facility or to another health facility.

The A&E uses a triage system of screening and classifying clients to determine their priority needs and to ration patient care efficiently. The A&E plays a key role in times of critical interventions of all kinds.

### **ACCIDENT AND EMERGENCY UNIT REQUIREMENTS**

For an A&E unit to function appropriately, it is required to have **areas/stations**:

1. Triage area.
2. A functional resuscitation area for patient stabilization.
3. A transient area for patient observation for not more than 24 hours
4. Procedure room for minor cases/Theatre
5. Waiting area
6. Ambulance bay
7. Customer care desk
8. Health Information / Health record desk
9. Cashier

### **A & E Team / Staff**

The A & E must be manned by competent and committed health care professionals.

An emergency **core team** (physically present at all times) should comprise the emergency doctors, emergency nurses, Critical care nurses, Clinical officers, orthopedic and plaster personnel, triage personnel, porters and cleaners.

The Expanded Team should comprise the following: Surgeons, trauma/orthopedic surgeon, neurosurgeons, radiologist, anesthetist, pharmacist and others as required.

The Unit is headed by an Accident and Emergency Physician. In the absence of this specialist, Medical Practitioner with requisite skills in A&E can be the head.

The head of the unit in collaboration with the A&E Head Nurse oversees the day-to-day running of the unit.

The unit is closely linked to diagnostic services like laboratory, radiology and other services like pharmacy, trauma counseling services, ambulance services, security, main theater and many others.

### **Training requirements**

All doctors and nurses should be trained in basic and advanced life support.

All other health professionals shall be trained in basic life support.

A&E teams should also be trained on Paediatric Advance Life Support and Triaging.

### **Standard Equipment**

Time is such an essential factor in emergency treatment; therefore A&E typically must have their own diagnostic equipment to avoid waiting for equipment installed elsewhere in the hospital. Ideally, the A&E shall have a dedicated Laboratory for basic laboratory tests or the A&E may be supported by uninterrupted 24-hour service from the hospital's main laboratory.

### **Airways/Breathing equipment and supplies**

- Bag and mask:
- Chest tube / underwater seal drainage
- Combitube
- Elastic gum bougies
- Endotracheal tubeTT
- Laryngeal Mask Airway
- Laryngoscope, various size s of blades
- McGill forceps
- Nasal prongs
- Nasopharyngeal airways
- Nebulizers
- Oropharyngeal airways
- Oxygen cylinder with a flow metre
- Suction machines and tubes
- Thoracotomy set
- Tongue depressor
- Tracheostomy set
- Transport Ventilators
- Ventilator (ICU)

**Circulation/Hemodynamic equipment and supplies**

- 12 lead ECG machine
- Central venous catheters
- Cut-down set
- Defibrillator/ Automated External Defibrillator (AED)
- Foleys catheter
- Infusion sets
- Intraosseous Needles
- IV cannulae 14, 16 18 20 and 22
- Syringes and needles

**Splints**

- Bandages
- cervical collar –soft/hard collar
- POP
- Spine board
- Splints (all types)
- Traction kits

**Monitoring Devices**

- Pulse oximeter
- Patient Monitors
- Glucometer
- Blood gas electrolyte analyser
- Thermometer
- Diagnosis set
- Stethoscope
- Sphygmomanometer (Digital & Aneroid)

**Other A&E Equipment**

- Bradlow tape measure (for children)
- Weighing scale
- Telephone and directory
- Pedal operated colour-coded waste bins
- Safety box for sharps
- Blood fridge
- Cabinets
- Computer and accessories and appropriate software
- Consumable cabinet
- Drug cabinet
- Examination couch
- Examination lamps
- Instrument trays
- Office furniture
- Refrigerator

- Resuscitation trolley/tray
- Stretchers
- Suction machine
- Mobile phones
- Trolleys
- Wheel chairs

### **Diagnostic**

- Blood gas/electrolyte analyzer
- Mobile X-ray machine
- Diagnostic set
- Diagnostic Peritoneal Lavage set
- Glucometer
- Laboratory sample set
- Lumber puncture set
- Minor surgical set.
- Foetal heart monitor
- Hand held Doppler machine
- Suprapubic catheter sets
- Ultrasound machine

### **Medicines**

Essential medicines needed for effective running of A & E are listed below:

- 50% Dextrose
- Adrenaline
- Nor-adrenaline
- Anti snake venom serum
- Aspirin
- Atropine
- Anti Tetanus Serum
- Dextran
- Diazepam
- Fresh Frozen Plasma
- Whole blood
- Heparin
- Hydralazine
- Hydrocortisone
- IM Glucagon
- Insulin
- IV calcium Gluconate
- IV Dopamine
- IV Fluid - all type
- IV Frusemide
- IV KCl
- IV Vit K
- Labetalol



- Lignocaine
- Magnesium Sulphate
- Mannitol
- Midazolam
- Morphine
- Naloxone
- Nitroglycerine
- Oral Rehydration Salt (ORS)
- Oxygen supply
- Pethidine
- Phenylephrine
- Propofol
- Salbutamol
- Sodium bicarbonate
- Suxamethonium

### **Other Equipment, Supplies and Medicines**

Other equipment, supplies and medicines not listed above may be obtained from the hospital's store and pharmacy as and when needed.

### **A & E Meetings/reviews**

The following meetings are necessary for A&E teams:

1. Clinical updates meetings.
2. Mortality meetings.
3. Inter-departmental or inter-unit meeting/reviews

### **Triaging and disposition**

The triage team should assess all patients presenting to the A&E.

A triaged patient should be attended to by a doctor as per clinical care guidelines.

Clinical decision regarding patient disposition (transfer or discharge) is normally made by the attending doctor.

### **TRIAGING**

**Triaging** is the process of determining the priority of patients' treatments based on the severity of their condition. This rations patient treatment efficiently when resources are insufficient for all to be treated immediately.

Several models of triaging are applied by different emergency medical services. The models generally classify casualties in three clusters:

- Those who are likely to live, regardless of what care they receive;
- Those who are likely to die, regardless of what care they receive;
- Those for whom immediate care might make a positive difference in outcome.

## S.T.A.R.T. model of Triage

S.T.A.R.T. (Simple Triage and Rapid Treatment) is a simple triage system that can be performed by lightly trained lay and emergency personnel in emergencies. It is not intended to supersede or instruct medical personnel or techniques. It was developed at Hoag Hospital in Newport Beach, California for use by emergency services. It has been field-proven in mass casualty incidents such as train wrecks and bus accidents, though it was developed for use by community emergency response teams (CERTs) and firefighters after earthquakes.

Triage separates the injured into four groups:

- The *expectant* who are beyond help
- The injured who can be helped by *immediate* transportation
- The injured whose transport can be *delayed*
- Those with *minor* injuries, who need help less urgently

Triage also sets priorities for evacuation and transport as follows:

- *Deceased* are left where they fell. These people are not breathing and an effort to reposition their airway has been unsuccessful.
- *Immediate* or Priority 1 (red) evacuation by MEDEVAC if available or ambulance as they need advanced medical care at once or within 1 hour. These people are in critical condition and would die without immediate assistance.
- *Delayed* or Priority 2 (yellow) can have their medical evacuation delayed until all *immediate* persons have been transported. These people are in stable condition but require medical assistance.
- *Minor* or Priority 3 (green) are not evacuated until all *immediate* and *delayed* persons have been evacuated. These will not need advanced medical care for at least several hours. Continue to re-triage in case their condition worsens. These people are able to walk, and may only require bandages and antiseptic.

## Hospital systems

Within the hospital system, the first stage on arrival at the emergency room is assessment by the hospital triage nurse. This nurse will evaluate the patient's condition, as well as any changes, and will determine their priority for admission to the Emergency Room and also for delayed treatment. Conventionally there are five classifications with corresponding colors and numbers although this may vary by region.

- **Black / Expectant:** They are so severely injured that they will die of their injuries, possibly in hours or days (large-area burns, severe trauma, lethal radiation dose), or in life-threatening medical crisis that they are unlikely to survive given the care available (cardiac arrest, septic shock, severe head or chest wounds); their treatment is usually palliative, such as being given painkillers, to reduce suffering.

- **Red / Immediate:** They require immediate surgery or other life-saving intervention, and have first priority for surgical teams or transport to advanced facilities; they "cannot wait" but are likely to survive with immediate treatment.
- **Yellow / Observation:** Their condition is stable for the moment but requires watching by trained persons and frequent re-triage, will need hospital care (and would receive immediate priority care under "normal" circumstances).
- **Green / Wait (walking wounded):** They will require a doctor's care in several hours or days but not immediately, may wait for a number of hours or be told to go home and come back the next day (broken bones without compound fractures, many soft tissue injuries).
- **White / Dismiss (walking wounded):** They have minor injuries; first aid and home care are sufficient, a doctor's care is not required. Injuries are along the lines of cuts and scrapes, or minor burns.

## TRANSPORTATION OF CASUALTIES

When lifting casualties, maximum care must be taken to avoid worsening an unstable trauma. The head-neck-chest axis must be kept straight to protect the spine, and the first aiders must keep the patient's body stable (no movement of the feet) during the lift. The first aiders have to carry a heavy load (probably more than 20 kg for an adult casualty) in an uncomfortable position. There is thus a risk of injury to the carrier, especially of the lumbar back. To avoid an injury, they must push with their legs (quadriceps), trying to keep their back straight.

### Scoop stretcher

The use of a scoop stretcher allows a secure lifting with only two team members even in case of a spinal trauma. The use of this device is thus recommended for most operations.

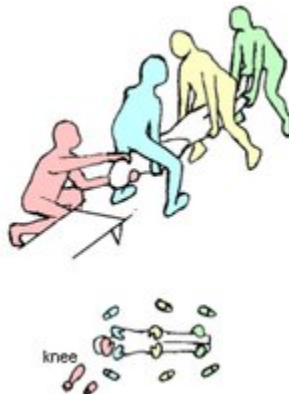
However, in many situations, there is a lack not of people but of devices. Additionally, the scoop stretcher does not allow the emergency service provider to maintain the legs up or a half-seated position for the casualty. For these reasons, the other methods are applied.

## Vertical lift (straddle lift)

### With five team members



Vertical lifting with five team members, the stretcher coming from the feet's side; the bottom illustration shows a view of the back of the casualty (from below), with the positions of the feet and of the hands of the first responders



Vertical lifting with five team members, the stretcher coming from the head's side

The most secured way to put a casualty on a stretcher is to use a vertical lift with five first aiders. The casualty is lifted by four first aiders while the fifth person holds the stretcher.

1. The first person (team leader) has one knee down, one knee up, and holds the head; he/she can hold it by sliding the finger under the head, the palm placed on each side of the head; or he/she can place one hand under the neck and hold the occiput, the other hand under the chin;
2. The second team member supports himself on the shoulder of another team member, and steps over the casualty; he/she puts his/her hands under the shoulders;
3. The third team member supports himself on the shoulder of another team member, and steps over the casualty; he/she puts his/her hands under the hip;
4. The fourth team member hold the ankles;
5. The fifth team member pushes the stretcher.

The feet of the team members must be enough spaced so the stretcher can slide in between. If the team leader uses the occipital-chin grip, the knee that is up is the knee on the side of the hand under the neck: as this arm supports the heaviest weight, it can support itself on the knee.

Another method consists in placing the team members at both sides of the casualty and holding the cloths. The cloths must be strong enough.

On the order of the team leader, the casualty is lifted, the stretcher is pushed, and the casualty is put down on the stretcher. During this procedure, the team leader remains kneeling (stable); the other team members lift pushing with their legs (arms stretched out, back kept straight). Then, the first and second team members pull back, supporting themselves on the shoulder of a still standing member.

With this method, the movement of the casualty is minimal, just vertical.

When there is no room at the feet of the casualty for the stretcher, it must then be placed on the side of the head. The team leader must then kneel aside. If he uses the occipital-chin grip, the hand under the neck must be the closest to the casualty's feet; the same knee is up.

### **With four team members**



Vertical lifting with four team members or "simple lifting"

With only four team members, it is necessary to use a "simple" lift: the team leader plays the role of the first team member: he steps over the casualty and places one hand under the neck, the other hand under the back, between the shoulder blades. The stretcher can come from the feet or from the head. This method is not adapted in case of suspicion of a spine trauma.

### **With two team members**

When the casualty has no specific trauma, it is possible to slide a long spine board little by little. A team member lifts a part of the body (head, then shoulders, then hips), and the other one slide the board.

## **Seated person**

Sometimes, it is necessary to lift a seated or half seated person: the seating position is adapted for a conscious person with a chest trauma or of respiratory difficulties.

For this, two team members are placed on each side of the casualty; they place one hand under the buttock, the other under the opposite armpit; the casualty places his/her arms around the neck of the team members. A third team member lifts the legs as usual, and a fourth pushes the stretcher. When a heart problem is suspected, the casualty should not lift his/hers arms.

## **Immobilization**

Fractures require splinting in the emergency setting if definitive treatment like surgery is not immediately available. Why immobilize?

- To stabilize the extremity,
- To reduce pain
- To actually treat the injury

Splints can be commercial, fabricated or simply improvised. Examples of splints available in our health care facilities include Thomas splint, Brown splint, aeroplane splint, etc. The splints are secured with bandages like crepe bandage (elastic bandage) or Gauze bandage.

## **UNCONSCIOUSNESS - The unconscious patient**

A decrease in the level of consciousness is a sign of lack of oxygen to the brain. Lack of oxygen to the brain results from:

Reduced blood flow to the brain (e.g. severe haemorrhage)

**or**

Reduced blood oxygen content (e.g. convulsions or anaemia)

### **Levels of consciousness**

**A** - Alert

**V** - Responds to Voice

**P** - Responds to Pain

**U** - Unresponsive

### **Managing unconscious patient**

Assess for **responsiveness**.

- Tap victim's shoulder and shout "Are you all right?"

- If no response, **shout for help**.

**Open airway and check breathing** (take at least 5 seconds and no more than 10 seconds)

- Use **head tilt-chin lift**

- **Look** for chest to rise & fall; **listen** for air during exhalation; **feel** for flow of air on your cheek

**If not adequate breathing, give 2 breaths.** Pinch nose and seal your mouth over victim's or use barrier device (e.g., face mask or bag/mask)

- **1 second per breath**; watch for **chest rise**

**Check pulse** (take at least 5 seconds and no more than 10 seconds).

- use 2-3 fingers of 1 hand; check **carotid pulse** between trachea & muscles at side of neck

**If do NOT definitely feel a pulse, perform 5 cycles of compressions and ventilations (30:2 ratio)**

- remove clothing from victim's chest

- put heel of 1 hand on center of victim's chest between the nipples

- put heel of other hand on top of first hand

- **Push hard & fast (100/minute)**; press straight down **1½ - 2 inches** with each compression

- after each compression, allow chest to recoil and re-expand completely

- deliver compressions at **rate of 100/minute**

- **do NOT interrupt chest compression often or for long**

- continue 30:2 until another providers take over, or victim starts to move

### **Head-To-Toe Assessment of Emergency Patients – secondary survey**

**Airway**

**Breathing**

**Circulation**

**Head and Neck**

Level of consciousness – cause for decreased consciousness,

Pupil size and reaction to light,

Examine eyes, ears, nose and mouth,

Bleeding, Foreign body, Drainage, Pain, Cyanosis,

Examine head:

Lacerations, Depressions, Contusions, Pain

Examine neck

Stiffness, Pain in cervical vertebrae,

Midline trachea, Distended neck veins, Bleeding, Ability to swallow

### **Chest**

Symmetry of chest wall, anterior and posterior chest

Motion: equal movement with respiration

External signs of injury or illness

Petechiae

Bleeding

Cyanosis

Pain

Respiratory distress

Breath sounds

Pain or deformity of vertebrae

### **Abdomen and pelvis**

Symmetry of external abdominal wall and bony structures

External signs of injury or illness

Pain – Localizing or rebound

Bowel sounds

Rigidity or distension of abdomen

### **Extremities**

Signs of external injury

Pain

Movement – arms and legs

Sensation in each limb

### **Peripheral pulses**

Present

Quality

## **ASPHYXIA**

Failure by a newborn to establish regular breathing associated with a bluish or pale appearance of the skin. Low APGAR score of less than 5 at 5 minutes.

### **Assessment**

- Is the baby **breathing** spontaneously or **crying**?
- If **yes**, give to mum for skin to skin and early breast feeding
- If **no**, **CALL FOR HELP**
- Note the time
- Wrap in a dry towel/hat

Assess

- **Breathing** - rate and quality - Look, Listen and Feel



- **Heart rate** - fast, slow, absent - use stethoscope.
- **Colour** - pink, blue, pale
- **Tone** - if floppy

### Open airway – Position

- Head in neutral position
- Use towel under shoulders

### Open airway – Techniques

- Chin lift (**avoid** over-extension)
- Jaw thrust

### Suction

- Suction is very rarely necessary
- Direct suction from larynx (only under direct vision) necessary if baby is born through thick **meconium**
- Otherwise only ever very gently with soft suction catheter

If breathing and no in-drawing or grunting Give baby to mother Keep under observation until stable for 6 hours

### If not breathing

- Place mask with bag over mouth, chin and nose
- Give **5** inflation breaths each lasting **2-3 seconds**
- Check rise of chest
- **Re-assess** heart rate after first five breaths
- Increasing heart rate or maintained **at over 100 beats per minute** is a sign of successful oxygenation
- Continue giving breaths at **30-40 breaths** per minute
- **If no heart beat or < 60 per minute**
- Make sure airway open and breaths adequate
- Give chest compressions
- Most common reason for low heart rate **is inadequate oxygenation**

### Giving chest compressions

Encircle chest so operator's thumbs meet on the sternum below the nipple line  
Compress chest by one third of its depth, **3 times** for every breath  
Once heart rate **is > 60 beats /min**, chest compressions can be discontinued

### Always stop and reassess

**When** to **stop** **resuscitation?**  
If no gasping or breathing after **20 minutes** of 'bag and masking',  
**or**  
Gasping but no breathing after **30 minutes**,  
Decision to stop resuscitation efforts depends on local resources...

## SHOCK

### What is Shock?

The presence of shock means that there is:  
An inadequate perfusion of organs and cells with oxygenated blood  
Some form of cardiovascular compromise  
Shock is a **life threatening** condition that requires **immediate, intensive** treatment

### Causes of Shock

**Bleeding** (Hypovolaemic shock)

**Sepsis** (Septic shock)

Heart failure due to **anaemia** can also be a cause shock

### Signs of shock

**Brain** - anxious, agitated and confused, drowsy or unconscious

**Skin** - sweaty or cold and clammy **OR** warm

**Conjunctivae** - pale

**Breathing** - rapid

**Pulse** - weak and fast >100/minute (sometimes “**bounding pulse**”)

**BP** - low systolic < 90 mmHg (**late sign**)

**Kidney** - poor urine output

**Septic** shock

**Tachycardia**

**Tachypnoea**

**Hypotension**

**Temperature** changes - Pyrexia (early) or Hypothermia (late)

**Poor response to simple fluid resuscitation**

**Shock-** immediate action

**Shout** for help

Assess consciousness

Assess Airway and Breathing

Check & clear airway

Check breathing

**If not Breathing:** Airway opening manoeuvres and CPR

**If Breathing:** Give oxygen (if available) and recovery position

**Assess** and **treat** **Circulation**

Get iv access and send blood samples for GXM

**If** pulse >100 beats/minute **or** BP < 90 mm Hg **or** heavy bleeding,

Give **1 litre** of fluids IV **over 20 minutes**

Give further **1 litre** IV **over 30 minutes**

Review the situation and repeat if necessary

**Beware** – if underlying anaemia or severe disease

## BURNS

### Minor burns

For minor burns:

**Cool the burn to help soothe the pain.** Hold the burned area under cool (not cold) running water for 10 to 15 minutes or until the pain eases. Or apply a clean towel dampened with cool tap water.

**Remove rings or other tight items from the burned area.** Try to do this quickly and gently, before the area swells.

**Don't break small blisters (no bigger than your little fingernail).** If blisters break, gently clean the area with mild soap and water, apply an antibiotic ointment, and cover it with a nonstick gauze bandage like paraffin gauze.

**Administer pain reliever/analgesic** such as ibuprofen, paracetamol or diclofenac.

**Consider a tetanus toxoid shot.** Make sure that your tetanus booster is up to date.

### **Major burns**

**Call emergency medical help** for major burns. Until an emergency unit arrives, take these actions:

**Protect the burned person from further harm.** If you can do so safely, make sure the person you're helping is not in contact with smoldering materials or exposed to smoke or heat. But don't remove burned clothing stuck to the skin.

**Check for signs of circulation.** Look for breathing, coughing or movement. Begin CPR if needed.

**Remove jewelry, belts and other restrictive items,** especially from around burned areas and the neck. Burned areas swell rapidly.

**Don't immerse large severe burns in cold water.** Doing so could cause a serious loss of body heat (hypothermia) or a drop in blood pressure and decreased blood flow (shock).

**Elevate the burned area.** Raise the wound above heart level, if possible.

**Cover the area of the burn.** Use a cool, moist, bandage or a clean cloth.

### **Is it a minor burn or a major burn?**

If it's not clear what level of care is needed, try to judge the extent of tissue damage, based on the following burn categories:

#### **1st-degree burn**

A first-degree burn is the least serious type, involving only the outer layer of skin. It may cause:

- Redness
- Swelling
- Pain

You can usually treat a first-degree burn as a minor burn. If it involves much of the hands, feet, face, groin, buttocks or a major joint, seek emergency medical attention.

#### **2nd-degree burn**

A second-degree burn is more serious. It may cause:

- Red or white skin
- Swelling
- Pain
- Blisters

If the second-degree burn is no larger than 3 inches (7.6 centimeters) in diameter, treat it as a minor burn. If the burned area is larger or covers the hands, feet, face, groin, buttocks or a major joint, treat it as a major burn and get medical help immediately.

### 3rd-degree burns

The most serious burns involve all layers of the skin and underlying fat. Muscle and even bone may be affected. Burned areas may be charred black or white. The person may experience:

- Difficulty breathing
- Carbon monoxide poisoning
- Other toxic effects, if smoke inhalation also occurred

### CHOKING

Choking occurs when a foreign object becomes lodged in the throat or windpipe, blocking the flow of air. In adults, a piece of food often is the culprit. Young children often swallow small objects. Because choking cuts off oxygen to the brain, administer first aid as quickly as possible. The universal sign for choking is hands clutched to the throat. If the person doesn't give the signal, look for these indications:

- Inability to talk
- Difficulty breathing or noisy breathing
- Inability to cough forcefully
- Skin, lips and nails turning blue or dusky
- Loss of consciousness

If choking is occurring, a "five-and-five" approach to delivering first aid is recommended:

**Give 5 back blows.** First, deliver five back blows between the person's shoulder blades with the heel of your hand.

**Give 5 abdominal thrusts.** Perform five abdominal thrusts (also known as the Heimlich maneuver).

**Alternate between 5 blows and 5 thrusts** until the blockage is dislodged.

To perform abdominal thrusts (Heimlich maneuver) on someone else:

- **Stand behind the person.** Wrap your arms around the waist. Tip the person forward slightly.
- **Make a fist with one hand.** Position it slightly above the person's navel.
- **Grasp the fist with the other hand.** Press hard into the abdomen with a quick, upward thrust — as if trying to lift the person up.
- **Perform a total of 5 abdominal thrusts**, if needed. If the blockage still isn't dislodged, repeat the five-and-five cycle.

If you're the only rescuer, perform back blows and abdominal thrusts before calling your local emergency number for help. If another person is available, have that person call for help while you perform first aid.

If the person becomes unconscious, perform standard CPR with chest compressions and rescue breaths.

To perform abdominal thrusts (Heimlich maneuver) on yourself:

First, if you're alone and choking you'll be unable to effectively deliver back blows to yourself, but you can still perform abdominal thrusts to dislodge the item.

- **Place a fist** slightly above your navel.
- **Grasp your fist** with the other hand and bend over a hard surface — a countertop or chair will do.
- **Shove your fist** inward and upward.

To clear the airway of a pregnant woman or obese person:

- **Position your hands a little bit higher** than with a normal Heimlich maneuver, at the base of the breastbone, just above the joining of the lowest ribs.

- **Proceed as with the Heimlich maneuver**, pressing hard into the chest, with a quick thrust.
- **Repeat** until the food or other blockage is dislodged or the person becomes unconscious.

To clear the airway of an unconscious person:

- **Lower the person** on his or her back onto the floor.
- **Clear the airway.** If a blockage is visible at the back of the throat or high in the throat, reach a finger into the mouth and sweep out the cause of the blockage. Be careful not to push the food or object deeper into the airway, which can happen easily in young children.
- **Begin cardiopulmonary resuscitation (CPR)** if the object remains lodged and the person doesn't respond after you take the above measures. The chest compressions used in CPR may dislodge the object. Remember to recheck the mouth periodically.

To clear the airway of a choking infant younger than age 1:

- **Assume a seated position and hold the infant facedown** on your forearm, which is resting on your thigh.
- **Thump the infant gently but firmly** five times on the middle of the back using the heel of your hand. The combination of gravity and the back blows should release the blocking object.
- **Hold the infant faceup on your forearm** with the head lower than the trunk if the above doesn't work. Using two fingers placed at the center of the infant's breastbone, give five quick chest compressions.
- **Repeat the back blows and chest thrusts** if breathing doesn't resume. Call for emergency medical help.
- **Begin infant CPR** if one of these techniques opens the airway but the infant doesn't resume breathing.

If the child is older than age 1, give abdominal thrusts only.

## ANIMAL BITES

Bites can either be from wild or domestic animals.

**For minor wounds,** If the bite barely breaks the skin and there's no danger of massive bleeding, treat it as a minor wound. Wash the wound thoroughly with soap and water. Apply an antibiotic cream to prevent infection and cover the bite with a clean bandage.

**For deep wounds,** If the animal bite creates a deep puncture of the skin or the skin is badly torn and bleeding, apply pressure with a clean, dry cloth to stop the bleeding. Continue with wound management and tetanus and rabies vaccination in the hospital.

## NOSEBLEEDING

Nosebleeds are common. Most often they are a nuisance and not a true medical problem. But they can be both.

**The victim should sit upright and lean forward.** By remaining upright, you reduce blood pressure in the veins of the nose. This discourages further bleeding. Sitting forward helps avoid swallowing blood, which can irritate the stomach.

**Pinch the nose.** Instruct the patient to use their thumb and index finger to pinch their nostrils shut. Let them breathe through the mouth. Continue to pinch for five to 10 minutes. Pinching sends pressure to the bleeding point on the nasal septum and often stops the flow of blood.

**To prevent re-bleeding,** don't pick or blow your nose and don't bend down for several hours after the bleeding episode. During this time remember to keep your head higher than the level of your heart.

**If re-bleeding occurs**, blow out forcefully to clear your nose of blood clots. Pinch the nose again as described above and seek medical attention.

## **POISONING**

Poisoning is injury or death due to swallowing, inhaling, touching or injecting various drugs, chemicals, venoms or gases. Many substances — such as drugs and carbon monoxide — are poisonous only in higher concentrations or dosages. And others — such as cleaners — are dangerous only if ingested. Children are particularly sensitive to even small amounts of certain drugs and chemicals.

How you treat someone who may have been poisoned depends on:

- The person's symptoms
- The person's age
- Whether you know the type and amount of the substance that caused poisoning

### **When to suspect poisoning**

Poisoning signs and symptoms can mimic other conditions, such as seizure, alcohol intoxication, stroke and insulin reaction. Signs and symptoms of poisoning may include:

- Burns or redness around the mouth and lips
- Breath that smells like chemicals, such as gasoline or paint thinner
- Vomiting
- Difficulty breathing
- Drowsiness
- Confusion or other altered mental status

If you suspect poisoning, be alert for clues such as empty pill bottles or packages, scattered pills, and burns, stains and odors on the person or nearby objects.

Call your local emergency number immediately if the person is:

- Drowsy or unconscious
- Having difficulty breathing or has stopped breathing
- Uncontrollably restless or agitated
- Having seizures
- Known to have taken medications, or any other substance, intentionally or accidentally overdosed (in these situations the poisoning typically involves larger amounts, often along with alcohol).

## **Intervention**

Take the following actions when you suspect poisoning:

**Swallowed poison.** Remove anything remaining in the person's mouth. If the suspected poison is a household cleaner or other chemical, read the container's label and follow instructions for accidental poisoning.

**Poison on the skin.** Remove any contaminated clothing using gloves. Rinse the skin for 15 to 20 minutes in a shower or with a hose.

**Poison in the eye.** Gently flush the eye with cool or lukewarm water for 20 minutes or until help arrives.

**Inhaled poison.** Get the person into fresh air as soon as possible.

**Medicated patches.** If you think a child got hold of medicated patches (adhesive products for transdermal drug delivery), carefully inspect the child's skin and remove any that are attached. Also check the roof of the mouth, where they can get stuck if the child sucks on them.

If the person vomits, turn his or her head to the side to prevent choking.

Begin CPR if the person shows no signs of life, such as moving, breathing or coughing.

**NOTE:** It is important to gather pill bottles, packages or containers with labels, and any other information about the poison to send along with the ambulance team.

Do not induce vomiting.

## **WOUNDS AND SEVERE BLEEDING**

### **For severe external bleeding:**

- Wear gloves, if possible, to prevent infection
  - Do not apply a tourniquet
  - If an object is embedded in or protruding from a wound apply pressure either side of the wound and place pads around it before bandaging
- Give nothing by mouth.

### **Unconscious casualty**

1. Follow DRABC.

### **Conscious casualty**

1. Follow DRABC.
2. Lie the casualty down and remove or cut their clothing to expose the wound.
3. Apply direct pressure over the wound using a pad or your hands (use gloves if available). Instruct the casualty to do this if possible.
4. Squeeze the wound edges together if possible.
5. Raise and support the injured part above the level of the heart. Handle gently if you suspect a fracture.
6. Apply a pad over the wound if not already in place and secure by bandaging over the padded wound.
7. If bleeding is still not controlled, leave initial pad in place and apply a second pad and secure with a bandage.
8. Check circulation below wound.
9. Ensure an ambulance has been called.

## **CONVULSIVE DISORDERS**

### **Signs & symptoms**

There are different types of seizures, and signs and symptoms may include the following:

- Suddenly cry out
- Fall to the ground
- Stiffen and lie rigid for a few seconds
- Have jerky, spasmodic muscular movements
- Look very pale and have blue tinged lips
- Have excessive saliva coming out of the mouth
- Sometimes bite the tongue or cheek



- Lose control of bladder and bowels
- Be extremely tired, confused or agitated afterwards.

### **What to do during the seizure**

1. Do not try to restrain the person.
2. Do not put anything in their mouth.
3. Do not move the person unless in danger.
4. Protect the person from injury by placing something soft under head and shoulders.
5. Record the duration of the seizure.

### **After the seizure**

1. Follow DRABC. Check the person's breathing and response.
2. Place the person in the recovery position as soon as jerking stops, or immediately if they have vomited or have food or fluid in their mouth.
3. Manage any injuries resulting from the seizure.
4. If the person falls asleep do not disturb them (this is normal) but do continue to check their breathing and response.

### **Call for ambulance if:**

1. The seizure continues for more than 5 minutes
2. Another seizure quickly follows
3. The person has been injured
4. The person is diabetic or is pregnant.

## **FRACTURES**

It can be difficult for a first aider to tell whether the injury is a fracture, dislocation, sprain or strain. If in doubt, always treat as a fracture.

DO NOT attempt to force a fracture back into place as this could cause further injuries. If collarbone (Clavicle) is fractured, support arm on injured side with a sling.

### **Signs & symptoms**

Pain at or near the site of the injury  
 Difficult or impossible normal movement  
 Loss of power  
 Deformity or abnormal mobility  
 Tenderness  
 Swelling  
 Discolouration and bruising.

### **Intervention**

1. Follow DRABC.
2. Control any bleeding and cover any wounds.
3. Check for fractures: open, closed or complicated.
4. Ask the patient to remain as still as possible.

Immobilize the fracture: use broad bandages (where possible) to prevent movement at joints above and below the fracture

Support the limb, carefully passing bandages under the natural hollows of the body

Place a padded splint along the injured limb

Place padding between the splint and the natural contours of the body and secure firmly.

For leg fracture, immobilise foot and ankle apply figure of eight bandaging.

1. Check that bandages are not too tight (or too loose) every 15 minutes and watch for signs of loss of circulation to hands or feet.
2. Ensure an ambulance has been called.

### **STINGS**

Stings can be from bees, wasps, scorpions etc.

Calm the patient

Apply an icepack directly over the sting site to relief the pain,

Seek medical attention if necessary

### **DISLOCATIONS**

It can be difficult to tell whether the injury is a fracture, dislocation, sprain or strain. If in doubt, always treat as a fracture.

No attempt should be made to force a dislocation back into place.

#### **Signs and symptoms**

- Deformity or abnormal mobility
- Pain at or near the site of the injury
- Difficult or impossible normal movement
- Loss of power
- Tenderness
- Swelling
- Discolouration and bruising

### **Intervention**

1. Follow DRABC.

2. If the injury is to a limb, check the circulation and if absent move the limb gently to try to restore circulation.
3. Rest and support the limb using soft padding and bandages. If injury is to a shoulder, support the arm as comfortably as possible and apply an icepack.
4. If the injury is to a wrist, support in a sling and apply icepack.
5. Apply icepacks directly over the injured joint, if possible.
6. Seek medical attention

## **SPRAINS AND STRAINS**

It can be difficult to tell whether the injury is a fracture, dislocation, sprain or strain. If in doubt, always treat as a fracture.

### **Signs & symptoms**

#### **Sprain**

Intense pain

Restricted mobility

Rapid development of swelling and bruising.

#### **Strain**

Sharp, sudden pain in region of the injury

Loss of power

Muscle tenderness.

### **Intervention**

1. Follow DRABC.
2. Follow the RICE management plan: REST the patient and the injured part.
3. Apply ICEPACK (cold compress) wrapped in a wet cloth to the injury for 15 minutes every 2 hours for 24 hours, then for 15 minutes every 4 hours for 24 hours.
4. Apply COMPRESSION elastic bandage firmly to extend well beyond the injury.
5. ELEVATE the injured part.
6. Seek medical attention if no improvement

## **ASTHMATIC ATTACK**

### **Signs & symptoms**

#### **Asthma attack**

Increasing wheeze

Cough

Chest tightness

Shortness of breath.

### **Asthma emergency**

Symptoms get worse very quickly

Severe shortness of breath

Can't speak comfortably

Lips may turn blue

Little or no relief from reliever inhaler.

### **Intervention**

#### **Unconscious patient**

1. Follow DRABC.

#### **Conscious patient**

1. Help the patient into a comfortable sitting position. Be calm and reassuring. Don't leave the person alone. Help them to follow their action plan.
2. Give 4 puffs of a blue/grey reliever. Use a spacer if available. Shake the reliever inhaler before each puff.
3. Give 1 puff at a time with 4 breaths after each puff.
4. Wait 4 minutes. If no improvement, give 4 more puffs.
5. If the person still cannot breathe normally call for an ambulance and say that someone is having an asthma attack.
6. Keep giving 4 puffs every 4 minutes (as above) until the ambulance arrives.

## **SPINAL INJURY**

### **Warning**

Take extreme care at all times to maintain alignment of the head, neck and spine.

If the patient is unconscious as a result of a head injury, always suspect a spinal injury.

### **Signs & symptoms**

Pain at or below site of injury

Loss of sensation, or abnormal sensation such as tingling in hands or feet

Loss of movement or impaired movement below site of injury

### **Intervention**

#### **Unconscious patient**

1. Follow DRABC.
2. Place unconscious patient in recovery position supporting neck and spine in a neutral position at all times to prevent twisting or bending movements.

3. Maintain a clear and open airway.
4. If ambulance is delayed, apply a cervical collar (only if trained to do so), to minimize neck movement.
5. Ensure an ambulance has been called.

### **Conscious patient**

1. Follow DRABC.
2. Calm the patient and loosen tight clothing.
3. Do not move the patient unless in danger.
4. Support head, neck and spine in a neutral position at all times to prevent twisting or bending movements.
5. If ambulance is delayed, apply a cervical collar (only if trained to do so), to minimise neck movement.
6. Ensure an ambulance has been called

## **NEAR DROWNING/ SUFFOCATION**

### **Definition**

Near drowning occurs when a person becomes submerged in a liquid, usually water, making breathing difficult and causing near death. In some cases, the individual survives initially, only to die of related causes more than 24 hours later.

### **What are the causes and risks of the injury?**

Near drowning is caused by lack of oxygen, whether or not water has entered the lungs. A deep pool of water is not the only drowning hazard. Someone can drown in a very small amount of water if the mouth and nose are covered, preventing the person from breathing.

Individuals at greatest risk for near drowning are those who are very young, very old, unable to swim, or those who tire easily. Many drowning or near-drowning cases are the result of recreational activities, such as boating or swimming. It is more common in areas where swimming pools are common. Unsupervised toddlers, in particular, are prone to near drowning. Other risk factors include swimming after drinking alcohol.

### **Recognition of victim**

A drowning victim will usually be spotted panicking at the surface of a body of water. Sometimes the person is found lying in the water or liquid, or on the shore near a large body of water.

### **Intervention**

First aid for near drowning includes the following steps:

- Get the drowning person out of the water without placing yourself in danger. Tie a rope to a buoy, life preserver, or other flotation device and throw it to the person. Use the rope to pull them out of the water.
- In deep water, try to use a boat or other object to reach the victim. Many people who are drowning will panic and pull the rescuer under water.
- Assess the airway, breathing and circulation.
- Immediately contact the emergency medical system.
- Start cardiopulmonary resuscitation, or CPR, if the person stops breathing. Use 30 chest compressions for every 2 rescue breaths.
- Stay with the victim and continue CPR until emergency help arrives, or until the person begins to breathe independently.
- If CPR is not needed, change any wet clothing, warm the person, and give first aid for any injuries.

**NOTE:** The person may vomit and choke on his or her vomit during CPR and rescue breathing. If the victim does start to vomit, turn the person on his or her side so that the vomit will not block the throat or airway.

## **FOREIGN BODIES**

### **Foreign Body under the Skin**

Skin may be pierced by thorns, glass, iron pieces, needles etc.

### **Management**

Unless very easy to deal with, don't interfere. Dress the wound, immobilise the part with splints and get medical aid.

### **Foreign Body in the Eye**

Wings of insects, dust, coal, metal particles, wood particles and loose eyelashes are common objects that get lodged in the eye. They cause pain and later redness if they are not removed soon. Sometimes splinters that get lodged in the cornea may cause severe trouble and penetrating foreign bodies are a danger to the eye itself.

### **Management**

- Avoid rubbing the eye. In the case of a child, tie his hands together at the back.
- Seat the patient so that light falls on the eye. Pull the lower lid down. If the foreign body is floating and not embedded remove it with a narrow moist swab. The corner of a handkerchief twisted to a fine point will also do.
- If the foreign body is not visible, it may be under the upper eyelid. Ask the patient to keep clean water in the hand and blink briskly into the water.
- If the foreign body is embedded in the eye, particularly in the cornea (the black of the eye), don't touch it. Apply a soft pad, ask the patient not to rub his eye and take him quickly to the hospital.
- Penetrating foreign bodies are easily made out by bleeding, pain etc. These are for doctors to handle. Just put a pad on the eye and rush to the hospital.
- When injury with corrosive acid, alkali or juices from plants are suspected, blinking eyelids under water a number of times or flushing with a large quantity of water is the best thing to do. Then apply a soft pad and take the patient to the hospital at once.

### **Foreign Body in the Ear**

- If the foreign body is an insect, fill the ear with glycerine or coconut or mustard oil or warm salt water. The insect will float up and can be removed easily.
- If there is nothing floating up, leave it alone, don't meddle at all but get the patient to a doctor as soon as possible.

### **Foreign Body in the Nose**

- Make the patient breathe through the mouth.
- Do not try to remove the foreign body.

- If the patient is a child, tie his hands behind his back.
- Get the patient to a doctor.

## **BANDAGING**

You can use a bandage to hold a dressing in place, to control bleeding, to support a limb and stop it moving, and to raise an injured limb to reduce swelling.

There are two main types of bandage:

1. **Roller bandages:** use these to hold dressings in place and to support injured limbs, particularly for ankles, knees, wrists or elbows.
2. **Triangular bandages:** use these as large dressings, as slings to support a wrist, arm or shoulder injury, or folded as a broad-fold bandage to stop a limb from moving.

If you can't find a bandage, then you can always improvise by using a piece of clothing or material. For example, you could fold a headscarf diagonally in half to make a triangular bandage for a sling.

### **How to put on a bandage:**

If someone's hurt themselves and you need to apply a bandage, below are the key things to remember.

- Reassure them and explain what you're going to do before you start.
- Make them comfortable by helping them sit or lie down in a comfortable position.
- Support the injury by holding the limb carefully, or ask them or someone else to help.
- Start bandaging from the front and from the side of the body or limb that's injured.
- Apply bandages firmly but not so tightly that it restricts their circulation.
- Generally, wrap the bandage using spiral turns working from the inside to the outside of the limb
- For joint injuries, make diagonal turns in a figure-of-eight above and below the joint. See below for specific techniques.



- To immobilise a limb, make a broad-fold bandage: lay a triangular bandage flat on a clean surface, fold it in half horizontally so the point touches the base, and then fold it in half again.
- Leave fingers and toes peeking out, if possible, so you can press them to check circulation afterwards.
- Use pins or tape to fasten roller bandages, otherwise, tuck the bandage in as securely as you can.
- Use reef knots to tie triangular bandages: right over left and under, then left over right and under.
- Check their circulation: Once you've finished, check for circulation, by pressing one of their finger or toe nails for five seconds until it goes pale. If the colour doesn't come back within two seconds, the bandage is too tight so you'll need to loosen it and do it again. Check their circulation every ten minutes.

### **Specific bandage techniques for joints:**

The most common types of injury are in the joints, which can seem a bit tricky but are easy if you know how, so make sure you know these three main techniques:

#### **How to bandage a hand**

You can bandage a hand to hold a dressing in place, or to support a sprained or strained wrist. If the bandage is to provide support, you need to wrap it either side of the injury too, to give enough support for the whole area

#### **What you need to do**

- To bandage someone's hand, use a roller bandage.
- Start by putting the end (tail) of the bandage on the inside of their wrist, below the bottom of their thumb, and wrap the bandage straight around their wrist, twice.
- Then, wrap the bandage from the inside of their wrist, diagonally across the back of their hand up to the nail of their little finger, straight across underneath their fingers, and diagonally back across the back of their hand to the outside of their wrist.
- Pass the bandage under their wrist and repeat the diagonal over the back of the hand, across the fingers and back again, so the tips of their fingers are still peeking out.
- Keep going in the same way, bandaging diagonally across the hand like a figure-of-eight, but each time, only cover about two thirds of the previous layer, so that with each new layer you're covering a third of new skin. Make sure you leave the tips of their fingers peeking out though.

- Once you've covered the whole hand, wrap the bandage straight around the wrist a couple of times, and then fasten the end using a safety pin or sticky tape or by tucking it in.
- As soon as you've finished, check their fingers for circulation, by pressing a finger nail for five seconds until it goes pale. If the colour doesn't come back within two seconds, the bandage is too tight so you'll need to loosen it and do it again. Their hand could keep swelling after you've bandaged it, so keep checking their circulation every ten minutes.

### **How to bandage a sprain**

If someone's sprained a joint, like an ankle, knee or elbow, you can use a bandage to support the limb.

To make sure you give the right kind of support, bend the joint slightly and then wrap the bandage in a figure-of-eight. You need to wrap it either side of the injury too, to give enough support for the whole area.

(For this example we're going to describe how to wrap an ankle, but you can use the same method to bandage an elbow or knee).

### **What you need to do**

- To bandage someone's ankle, use a roller bandage
- First, you need to hold the ankle in a comfortable position, with the joint slightly bent
- Start by putting the end (tail) of the bandage on the inside of their ankle. Pass the bandage over and around to the outside of the ankle, and go round one and-a-half times, so that the tail end of the bandage is firmly covered and won't come loose
- Then make a figure-of-eight around the joint, wrapping the bandage diagonally above and then below the joint
- Keep going with the figure-of-eight, but each time, only cover about two thirds of the previous layer, so that with each new layer you're covering a third of new skin
- Once you've done this several times, wrap the bandage straight around the ankle a couple of times, and then fasten the end using a safety pin, sticky tape or by tucking it in
- As soon as you've finished, check their toes for circulation, by pressing their big toe nail for five seconds until it goes pale. If the colour doesn't come back within two seconds after you stop pressing, the bandage is too tight so you'll need to loosen it and do it again. Their ankle could keep swelling after you've bandaged it, so keep checking their circulation every ten minutes.

## **How to make an arm sling**

An arm sling stops someone's arm moving (immobilisation) and protects it so it can heal. It's also a useful warning to others that someone has an injury so they should be careful around them.

There are two types of arm sling – an arm sling and an elevation sling. You can make both using a triangular bandage.

### **Arm sling**

An arm sling holds someone's forearm in a horizontal or slightly raised position. This gives support for:

- an injured upper arm
- an injured wrist or forearm
- someone who can bend their elbow
- someone with a rib fracture

### **Arm sling – what you need to do**

### Step 1 of 5: Support their bad arm



- Ask them to support their bad arm with their other hand. Slide the triangular bandage underneath it, with the longest edge (the base) parallel to their body at the tip of the little finger. The tip of the bandage (the point) should stick out past their elbow.

**Step 2 of 5: Pull the top bit**



- Gently pull the top bit under their bad arm and around the neck to the opposite shoulder.
- Take the bit that's hanging down over their arm and up to meet the other end at their shoulder.

### Step 3 of 5: Make a reef knot



- Tie the ends together in a reef knot at the hollow above their collar bone and tuck in the ends.

### Step 4 of 5: Adjust the sling



- Adjust the sling so that it supports their arm all the way to the top of their little finger.
- Twist the tip by their elbow until it fits snugly around their elbow and tuck it in or safety pin it.

**Step 5 of 5: Check their circulation**



- Check their circulation in their fingers and keep checking every ten minutes. If it's too tight, loosen the bandage and sling and tie them again.

## FIRE EXTINCTION: METHODS AND APPROACHES

Hundreds of thousands of fires, both big and small, break out in workplaces around the country every year. Many of these fires are controllable and only a very small percentage result in fatalities. There is therefore need for staff to have skills on fire extinguishing practices.

To understand how best to extinguish a fire, there must first be an appreciation of the three elements that make up the 'fire triangle': **heat, fuel and oxygen**. As fire is primarily a chemical reaction, removing one or more of these three factors will prevent the combustion from taking place.

### ○ The Fire Triangle

A simple model for understanding the chemical reaction involved in a fire, once your staff understand how a fire starts, it is much easier for them to understand how to react.



A fire needs three elements to ignite:





**Heat** is required to ignite a fire, and will continue to be generated as the fire burns. For intentional fires, this could be as simple as the striking of a match. For accidental fires however, ignition can occur as a result of obstructing ventilation on machinery that heats up, or flammable materials being too close to heaters.

**Fuel** can be anything that is combustible, such as wood, petroleum and spirits, and a number of gases. Solid fuels must reach a critical temperature in order to ignite, while many liquids release flammable vapours even when cold. Gases are the most hazardous and temperamental state, and can combust instantaneously.

The **air** feeding a fire only needs to be made up of 16% **Oxygen** in order to react with the heat and fuel. Generally, at low/normal altitude, the level is over 20%.

## **Effective Fire Extinction**

If the three parts of the ‘fire triangle’ are kept in mind, extinguishing a small blaze should be a matter of common sense. The principles of fire extinction state that a fire will be put out if one of the three elements are removed, and this can be done using three different approaches, as detailed below...

### **Cooling**

Removing the heat is one of the most effective methods of fire extinction available, which is why water is a popular extinguishing material. The fire will go out so long as the heat generated by the fire is less than that which is absorbed by the water.

***Remember:*** *water is not an appropriate extinguishing material to use on electrical fires, as well as those caused by cooking oils/fats or other flammable liquids.*

### **Starving**

While cooling removes the heat/ignition element of the ‘fire triangle’, starving the blaze of its fuel source approaches extinction from a different angle. A raging fire will burn itself out if it runs out of flammable materials, such as a bonfire out in the open that isn’t in contact with any other wood or dry grass. Similarly, a gas fire will immediately extinguish if the gas supply is cut off – you only have to look at a gas stove or Bunsen burner to see that.

### **Smothering**

As the other key component present in the chemical reaction that causes combustion, removing oxygen from the equation is the final way of extinguishing a fire. For example, smothering a frying pan blaze with a fire blanket reduces the oxygen to below the 16% required to react, while covering a candle with a glass will snuff it out in a vacuum.

Smothering is a technique that is mostly applicable to solid fuel fires, although some materials may contain enough oxygen within their own chemical make up to keep the blaze burning.

## **FIRE EXTINGUISHING METHODS**

COOLING: Removal of HEAT (by water)

STARVATION: Removal of FUEL (by cutting fuel supply)

SMOTHERING: Removal of OXYGEN. (by using CO<sub>2</sub> or DCP- dry chemical powder or blanket)