# VIRGINIA DEPARTMENT OF ENERGY

# FIRST AID FOR MINERS
# STUDY GUIDE

## 2025 Edition

Commonwealth of Virginia
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# VIRGINIA DEPARTMENT OF ENERGY
## DISCLAIMER

Article 3 of the **Coal Mine Safety Laws of Virginia** establishes requirements for certification of coal mine workers. The certification requirements are included in §45.2-515 through §45.2-534 in which the Board of Coal Mining Examiners is established for the purpose of administering the certification program. The Board has promulgated certification regulations 4 VAC 25-20, which set the minimum standards and procedures required for Virginia coal miner examinations and certifications.

The Virginia Department of Energy developed this study guide to better train coal miners throughout the mining industry. The study guide material should be used to assist with the knowledge necessary for coal mining certifications. The material is not all-inclusive and should be used only as an aide in obtaining knowledge of the mining practices, conditions, laws and regulations. This material is based upon the Coal Mining Safety Laws of Virginia, Safety and Health Regulations for Coal Mines in Virginia, Title 30 Code of Federal Regulations (30 CFR), State and Federal Program Policy Manuals and other available publications. Nothing herein should be construed as recommending any manufacturer's products.

**The study guide and materials are available at the Virginia Department of Energy at the Big Stone Gap Office.**

# FIRST AID

## A. INTRODUCTION

First Aid is defined as the immediate and temporary, emergency medical care provided to an injured person or one who suddenly becomes ill. It includes recognizing and evaluating the seriousness of injuries and providing appropriate, effective treatment.

The safety of the rescuer(s) must always be the first and foremost consideration and to the extent possible, preserving safety of the patient(s).

A primary survey is conducted first to evaluate and treat life-threatening problems, including airway, breathing, circulation, and bleeding. A secondary survey is conducted to administer and treat wounds, fractures, shock, dislocations, stabilization, transportation, etc.

This First Aid Study Guide is not intended to take the place of a complete study course manual in first aid principles and practices. All miners, especially foremen and other supervisors, are encouraged to enroll in advanced first aid training courses and to maintain skills current through regular refresher training. Prompt, effective first aid treatment rendered in case of accident or illness may very well make the difference between the life and death of a patient.

This study guide has been developed to assist those miners planning to take various certifications issued by the Board of Coal Mining Examiners.

## Table of Contents

Musculoskeletal Injuries



Injuries of the head and spine



Injuries of the chest, abdomen and pelvis



Injuries of the extremities

# MANAGING AN EMERGENCY SCENE

## Managing Dangers at an Emergency Scene

Some emergency scenes are immediately dangerous.
Some emergency scenes may become dangerous while you are providing care.

## Personal Safety

Personal safety and the safety of all others assisting in rescue efforts must always be the first and foremost consideration.
To the extent possible within rescuer safety, action should be taken to preserve the safety of patients.

Approach all emergency scenes cautiously until you have fully evaluated the situation for your personal safety and the safety of others helping you.

If at any time the scene appears unsafe, retreat to a safe location.

Never enter a dangerous scene unless you have qualified personnel, such as a mine foreman or electrician, to assist you.

Follow these guidelines when arriving on an emergency scene:

1) Take time to evaluate the scene and recognize existing and potential dangers.
2) Never attempt to do anything you are not trained to do.
3) Get the help you need to ensure your safety, safety of others assisting you, and to the extent possible, the patient.

## Safety of Others

Discourage other people from entering an area that appears unsafe.
Never move patients until you treat and stabilize unless immediate dangers threaten the patient or yourself. If necessary to move a patient, do so safely and quickly.

## LEGAL CONSIDERATIONS

Standard of care: The minimum and quality of care that you are expected To provide based on you level of training.

Negligence: The failure to provide a reasonable standard of care that a person with similar training would provide, thereby causing injury or damage to another person.

*Examples:* Acting wrongly or failing to act at all. Four factors that must be present to be charged for negligence:

1) duty to respond
2) breach of duty for failing to respond
3) actions that cause an accident or improper care
4) damage results to a person

Good Samaritan Laws: Laws that protect people who willingly provide emergency care without accepting anything in return.

Apply when you:

1) Act in good faith
2) Are not negligent
3) Act within the scope of your training

Consent: Permission to provide care, given by an ill or injured person to a rescuer.

Identify yourself, your level of training, what you think may be wrong, what you can do to help.

Actual or informed consent: A person granting you, the rescuer, permission to treat them.

Implied consent: Legal authority to treat all unconscious patients or patients so seriously injured or ill that they cannot respond and minors who need medical care when a parent or guardian is not present.

Refusal of care: The declining or refusal of a patient to allow you to provide medical care.

Assault and battery: Intentional touching of someone without their permission.

A person, in a competent state of mind, has the legal right to refuse medical treatment regardless of how seriously injured or ill that they may be.

Abandonment: Ending care of an ill or injured person without that person's consent or failing to ensure that someone with equal or greater training will provide that care.

Confidentiality: Protecting a patient's privacy by not revealing any personal information you learn about the patient except for information that other medical or law enforcement personnel may need.

Never discuss the patient's condition or the care that you provided to anyone.

**VIRGINIA GOOD SAMARITAN LAW**
**Code of Virginia: 8.01-225**

**CHAPTER 978 – April 2, 2003**

**8.01-225.** Persons rendering emergency care exempt from liability.

A. Any person who:

FIRST AID - In good faith, renders emergency care or assistance, without compensation, to any ill or injured person at the scene of an accident, fire, or any life-threatening emergency, or en-route there from to any hospital, medical clinic or doctor's office, shall not be liable for any civil damages for acts or omissions resulting from the rendering of such care of assistance.

Any person who in good faith without compensation, administers epinephrine to an individual for whom an insect sting treatment kit has been prescribed shall not be liable for any civil damages for ordinary negligence in acts or omissions resulting from the rendering of such treatment if he has reason to believe that the individual receiving the injection is suffering or is about to suffer a life-threatening anaphylactic reaction.

**EMT** - Any person who is an emergency medical care attendant or technician possessing a valid certificate issued by authority of the State Board of Health who in good faith renders emergency care or assistance whether in person or by telephone or other means of communication, without compensation, to any injured or ill person, whether at the scene of an accident, fire or any other place, or while transporting such injured or ill person to, from or between any hospital, medical facility, medical clinic, doctor's office or other similar or related medical facility, shall not be liable for any civil damages for acts or omissions resulting from rendering of such emergency care, treatment or assistance, including but in no way limited to acts or omissions which involve violations of State Department of Health regulations or any other state regulations in the rendering of such emergency care or assistance.

**CPR** - Any person who in good faith and without compensation, renders or administers emergency cardiopulmonary resuscitation, cardiac defibrillation, including, but not limited to, the use of an automated external defibrillator, or other emergency life-sustaining or resuscitative treatments or procedures which have been approved by the State Board of Health to any sick or injured person, whether at the scene of a fire, an accident or any other place, or while transporting such person to or from any hospital, clinic, doctor's office or other medical facility, shall be deemed qualified to administer such emergency treatments an procedures and shall not be liable for acts or omissions resulting from the rendering of such emergency resuscitative treatments or procedures.

**AED** - Any person who operates an automated external defibrillator at the scene of an emergency, trains individuals to be operators of automated external defibrillators, or orders automated external defibrillators shall be immune from civil liability for any personal injury that results from any act or omission in the use of an automated external defibrillator in an emergency where the person performing the defibrillation acts as an ordinary, reasonably prudent person who have acted under the same or similar circumstances, unless such personal injury results from gross negligence or willful or wanton misconduct of the person rendering such emergency care.

**TRANSPORTATING INJURED PERSON IN PERSONAL VEHICLE**

Nothing contained in this section shall be construed to provide immunity from liability arising out of the operation of a motor vehicle.

## BODY SYSTEMS

Body systems depend on each other to operate properly. Some examples are the nervous, respiratory and circulatory systems that work together to allow for breathing and consciousness.

Vital organs - Brain, Heart and Lungs.

Anatomical terms

Lateral, medial, anterior, posterior, superior, inferior, proximal, distal.

Body cavities

Cranial cavity, spinal cavity, thoracic cavity, abdominal cavity, pelvic cavity.

Body systems

Respiratory system - Responsible for breathing air/oxygen enters the lungs when you inhale and leaves the lungs when you exhale.

Respiratory arrest - Condition when a person stops breathing

Cyanosis - Indicates a lack of oxygen in the blood (blue skin color of lips, nailbeds, etc.)

Rescue breathing - Breathing for a patient

Circulatory System - Responsible for circulation of blood and oxygen to all body organs. Consists of the heart, blood vessels and blood

Contraction - pumping action of the heart

Pulse - Feeling the heart's contractions at an artery that lies near the skin and over a bone

Cardiac arrest - The heart and breathing have stopped

CPR - Cardiopulmonary Resuscitation

Nervous System - Most complex and delicate of all body organs.

Consists of the brain, spinal cord and all nerves
Brain - Master organ of the body

Brain regulates all body systems including the respiratory and circulatory systems. Nerves extend from the brain, through the spinal cord to every muscle and every organ in the body

Brain - Center responsible for consciousness, breathing and heartbeat

Normal state of consciousness - 3 W's - who, where, what
A patient knowing who they are, where they are and what is happening around them

Paralysis - Loss of feeling or movement below (distal) to an injury

Musculoskeletal System - Consists of bones, muscles, ligaments and tendons.

Musculoskeletal System performs the following:

Supports the body
Protects vital organs
Allows body movement
Stores minerals and produces blood cells
Produces heat

Integumentary System - Consists of skin, hair and nails.

Skin is most important because it protects the body from germs and keeps body fluids within

Endocrine System - Consists of glands that release fluid into other body systems.

Most Recognized - pancreas which produces insulin

The gastrointestinal system - Consists of organs that work together to break down food and eliminate waste.

Damaged organs release contents and blood
Damaged organs cause severe pain and severe infections

Genitourinary System - Consists of urinary system and the reproductive organs.

The most common injuries occur to the kidneys and the bladder

## DISEASE TRANSMISSION AND BLOODBORNE PATHOGENS

Providing First Aid to Patients

Bloodborne pathogens - Bacteria and viruses present in human blood and other body fluids that cause disease in humans

Pathogens - Hepatitis A and B, AIDS, Herpes, Meningitis, Tuberculosis

Pathogen - A disease-causing agent, such as a germ, virus or bacteria.

Immune system - A person's body (white blood cells in the blood) attack and attempt to destroy pathogens

4 conditions must be present for a disease to spread:

1) A pathogen is present.
2) Sufficient pathogen quantity to cause a disease.
3) A person is susceptible to the pathogen.
4) The pathogen is transmitted through the correct entry site.

Pathogens enter the body in 4 ways:

1) Direct contact: A person touches an infected person's body fluids.
2) Indirect contact transmission: A person touches objects contaminated by the blood or body fluids of an infected person.
3) Airborne transmission: A person inhales infected droplets that become airborne when an infected person coughs or sneezes.
4) Vector transmission: Occurs when an animal such as a dog or another person bits a person and transmits the pathogen through the bite.

Diseases that cause concern:

Herpes (Virus):
Transmitted by direct contact with herpes sores.
Cause infections of the skin and mucous membranes.
Commonly called cold sores.

Most serious forms of herpes - Sores form on the face, neck, shoulders and genital area.

Meningitis (Virus or Bacteria):
Transmitted by direct, indirect and airborne means.
A severe infection of the covering of the brain and spinal cord.
Highly contagious, easily spread.
Spread through secretions from the mouth or nose, an infected person coughing, indirect contact with an infected person's secretions, unprotected rescue breathing, unprotected CPR, etc.

Hepatitis (Virus):
A severe infection of the liver.
Transmitted through direct and indirect contact.

Hepatitis A (Virus):
1) Common in children.
2) Transmitted by contact with food or stool from an infected person.
3) Patient has flu-like symptoms, with yellowing of the skin (jaundice).
4) Usually not serious.

Hepatitis B (Virus):
1) Severe infection can be fatal.
2) Transmitted by blood-to-blood or sexual contact with an infected person.
   Not transmitted by casual contact such as shaking hands, or indirect contact from a drinking fountain, telephone, etc.
3) Highest risk occurs with unprotected direct or indirect contact with infected blood.

Tuberculosis (Bacteria):

Infection of the respiratory system (bacteria live in an infected person's lungs).
Transmitted by direct contact with saliva, respiratory secretions from coughing, spitting, speaking, singing and inhaling airborne droplets from an infected person.

HIV-AIDS (Virus):

Virus that attacks and weakens a person's immune system. Causes severe pneumonia, infections of the mouth and esophagus and unusual cancers.

Important to remember about AIDS:

1) Cannot be spread through casual contact
2) Virus is easily killed by alcohol, bleach and other common disinfectants
3) Known to be transmitted only through infected blood, semen, vaginal secretions or rarely breast milk
4) Transmitted through:
    a - Unprotected sex with an infected person.
    b - Exposed to blood or equipment contaminated with blood from an infected person that may enter your body through the mouth, nose or broken skin.
    c - Unborn child of an infected mother.
    d - Sharing needles from drug use, ear piercing, etc.

## Protecting Yourself from Disease Transmission Begins with Preparation and Planning - Health Status of Patient is Unknown

Protective equipment - prevents you from making direct contact with infected materials

Wear disposable, surgical gloves (single use) when you may contact blood or body fluids.
Remove gloves by turning inside out, peeling off while avoiding direct contact with a contaminated surface.
Discard torn or punctured gloves.
Never clean or reuse disposable gloves.
Change gloves when treating multiple patients.
Always use disposable resuscitation masks when providing rescue breathing and/or CPR ventilations.

### Personal Hygiene - Important in Helping to Prevent Infections

Wash your hands thoroughly with soap and water immediately after treating a patient
Avoid eating, drinking, touching your mouth, nose or eyes while treating a patient before washing your hands.

## Equipment Cleaning and Disinfecting - Very important to clean and disinfect equipment to prevent infections.

Handle all contaminated equipment very carefully until it's cleaned and disinfected.
Wash contaminated equipment with a solution of ¼ cup chlorine bleach per gallon of water.

## Exposure to Infectious Disease:

Wash any area of contact as quickly as possible.

Document the situation in which the exposure occurred.

Notify your superior and any involved medical personnel immediately (The involved medical facility may test the patient to confirm a suspected infectious disease).

The medical facility will notify you and you can get exposure care, if a disease is confirmed.

If ever in doubt, see your personal doctor.

## BLOODBORNE PATHOGENS

Bloodborne pathogens are microscopic organisms found in human blood or other body fluids of infected persons that can infect and cause disease in humans.

The body fluids that have been found to contain bloodborne pathogens are:

Blood
Semen
Vaginal secretions
Breast milk
Fluid from spine, lungs and joints
Urine
Feces
Saliva
Vomit

However, only the first four have been proven to spread HIV-AIDS virus.

The two-bloodborne pathogens most likely to be encountered in the workplace are:

HIV, the Human Immunodeficiency Virus which causes AIDS, Acquired Immune Deficiency Syndrome.

The Hepatitis B virus

HIV - A very fragile virus usually dies by the time that it takes for blood to dry.

Hepatitis B - Can live in dried blood for up to 6 weeks.

HIV/AIDS

Aids affects the immune system of the infected person, limiting the ability of the body to fight off infection, parasites and viruses.

Aids patients usually die from other infections.

HIV, the virus that causes AIDS, may be in the body many years before noticeable symptoms develop. Aids is a syndrome.

It is currently believed that everyone infected with HIV will eventually develop AIDS (the mean time is 8-10 years).

Some people have been known to have HIV for 15 years and still not develop full-blown AIDS.

Symptoms of HIV infection include:

Fever
Aches
Swollen Glands
Sore Throat
Diarrhea
Tiredness
Rashes

Symptoms of AIDS include:

Rapid weight loss
Long-lasting fever
Swollen Lymph glands
Frequent diarrhea
Continuous dry cough
Brain dysfunction
Purple or discolored growths on the skin

## Hepatitis B Virus

Some experts estimate that the Hepatitis B Virus is as much as 100 times more easily spread than HIV.

Hepatitis can either mean an inflammation or infection of the liver.

You hear more about Hepatitis B Virus because it is the one you are most likely to encounter in the workplace, and there is an effective and safe vaccine to protect you from exposure to Hepatitis B Virus.

1 Teaspoon of contaminated blood contains at least one-half million particles that could cause Hepatitis B.

1 Teaspoon of contaminated blood contains 10 to 15 particles that could cause HIV-AIDS.

One third of those infected with Hepatitis B do not experience any symptoms.

One third only have mild flu-like symptoms.

Two thirds of the people that have Hepatitis do not know they have it.

One third have these symptoms:

- Abdominal pain
- Nausea
- Fatigue
- Jaundice
- Dark urine
- Joint pain

## Ways You Cannot Be Exposed In the Workplace

Shaking hands
Casual touching
Working in close conditions with others
Sharing telephones, office equipment or furniture
Sharing dishes, utensils or food
Sharing sinks, toilets or showers
Drinking from fountains
Having close contact with someone who sneezes or coughs

## Ways You Can Be Exposed in the Workplace

Infectious fluids can enter the body through puncture wounds from contaminated materials such as broken glass, metal, etc.
Remember, even gloves may not prevent you from being stuck.
Infectious fluids can enter the body through wounds, cuts, rashes or broken skin. You may not be aware your skin is broken.
Infectious fluids can enter the body through mucous membranes of the eyes, nose and mouth.

## Protecting Yourself

Understand and follow Universal Safety Precautions, which means that all blood and body fluids should be treated as if known to be infectious for HIV, Hepatitis B Virus, and other bloodborne pathogens.

Have a properly equipped first aid kit handy to your worksite. It should contain the barriers needed to perform CPR without exposing yourself to danger from bloodborne pathogens.

Always place a barrier between you and the blood or body fluids of the injured person.

Personal protective equipment, which can act as a barrier to the source of bloodborne pathogens, includes but is not limited to:

Face shields/masks with one-way valves
Gloves (disposable)
Safety glasses
Mouth pieces
Resuscitation bags
Fluid-resistant work clothes

## Protecting Yourself

Wash your hands with soap and water for 10-15 seconds as soon as possible after contact with blood or other body fluids (even if gloves were used).
Washing your hands and arms up to the elbows has proven to remove 97% of exposed germs.

## Clean-up

If equipment, tools and/or the work area become contaminated with blood or other body fluids, use bleach for decontamination because it is inexpensive, it is commonly available, and a 10% solution kills all known bloodborne pathogens. A 10 % solution is obtained by mixing one-fourth cup bleach with one gallon water.

HIV dies rapidly when exposed to air; it dies shortly after the infected blood dries.

Hepatitis B Virus, however, lives in dry infected blood for several days.

## Clean-Up

Dispose of contaminated materials in sealed containers to prevent leakage. The containers must have a fluorescent orange or orange-red biohazard label and should be handled by individuals who know how to handle hazardous wastes.

## Post-Exposure Evaluation and Follow-Up

Immediately following an exposure incident, the following procedure should be followed:

An authorized person should conduct a follow-up evaluation with the exposed employee documenting:

The routes of exposure and how the exposure occurred

The identity of the source individual

Whether or not the employee has been vaccinated for Hepatitis B Virus

After obtaining consent, collect the exposed employee's blood as soon as feasible after the exposure incident and test it for Hepatitis B Virus and HIV status.

If the exposed employee consents to having the blood drawn but does not give consent for the Hepatitis B Virus and HIV testing, the employer must preserve the blood sample for at least 90 days, allowing ample time for the employee to change his or her mind.

Obtain consent and test the source individual's blood. If consent was not obtained, document the effort to obtain it.

If available, provide the exposed employee with the source individual's test results and information about applicable disclosure laws and regulations.

With the consent of the exposed employee, the employer should coordinate post-exposure counseling sessions.

## QUESTIONS FOR REVIEW

**Managing An Emergency Scene**
**Disease Transmission**
**Pathogens**

**Legal Considerations**
**Bloodborne**

Q. Which of the following is the first thing to evaluate at the scene of all types of emergency situations?

A. Rescuer and bystander safety.

Q. What is the correct order of events that a rescuer should take at the scene of an emergency?

A. Survey the scene, check the patient, call for advanced medical help

Q. What factors are used to consider negligence of a patient?

A. Failing to act when necessary,
Giving incorrect first aid,
Failing to provide first aid when necessary.

Q. When is a rescuer protected by the Good Samaritan Laws?

A. Acting in good faith,
Are <u>not</u> negligent,
Acting within the scope of your training.

Q. What is necessary to be considered informed consent when treating a patient?

A. Identify yourself and your level of training,
Explain what you think may be wrong,
Explain what you plan to do.

Q. What is necessary to be considered implied consent when treating a patient?

A. Unconscious patient,
A seriously ill and confused patient,
A seriously injured patient.

Q. What is necessary to be considered abandonment?

A. Failure to continue first aid treatment once you have begun and until relieved by a person with equal or higher training.

Q. What is a general first aid rule concerning patient treatment?

A. Never move a patient until stabilized unless the safety of the rescuer or the patient is threatened.

Q. What is a general first aid rule to always remember at the scene at any emergency?

A. Never attempt to rescue or treat a patient in a location that you are not trained or familiar with.

Q. What is the first thing to do when you think a patient may be in contact with an electrical circuit?

A. Ensure that the electrical circuit is de-energized before touching the patient or entering the immediate area where the patient is located.

Q. What body part is distal to the elbow?

A. Hand.

Q. What is a major organ located in the upper right abdomen?

A. Liver.

Q. What is a major organ located in the upper left abdomen?

A. Spleen.

Q. What are considered vital organs?

A. Brain, heart, lungs.

Q. Which of the following systems is responsible for getting air into the lungs?

A. Respiratory.

Q. Which of the following systems is responsible for getting oxygen from the lungs to all parts of the body?

A. Circulatory system.

Q. How many times does an adult breathe per minute?

A. 10 to 20.

Q. What is respiratory arrest?

A. Absence of breathing.

Q. What is cyanosis?

A. A bluish discoloration of the skin, especially the lips and nailbeds.

Q. What may be present in a patient having breathing difficulties?

A. Noisy breathing.

Q. What can be felt in a major artery each time the heart contracts or beats?

A. Pulse.

Q. What is the master organ of the body?

A. Brain.

Q. Which organ controls the state of consciousness?

A. Brain.

Q. Which organ regulates all body functions?

A. Brain.

Q. What method is used to evaluate a patient's state of consciousness?

A. 3 W's (who, what, where) This means-does the patient know:

1) Who they are,
2) What they're doing,
3) Where they are.

Q. What is a description a responsive patient?

A. A patient that can speak, move, blink or otherwise react to the voice or touch of a coworker or rescuer

Q. What is a description of an unresponsive patient?

A. A patient that cannot speak, move, blink or otherwise react to the voice or touch of a coworker or rescuer

Q. Which organ is the controlling center of the nervous system?

A. Brain.

Q. What can cause a rescuer to become seriously sick?

A. Germs, bacteria and viruses in a patient's blood or body fluids.

Q. What is a sign?

A. A sign is what a rescuer will see (ex: pale skin, bleeding, vomiting, etc.).

Q. What is a symptom?

A. A symptom is what a patient tells you (ex: I feel sick, I can't move my legs, etc.).

Q. What is always required for a disease to be spread to a rescuer?

A. The presence of germs (pathogen),
Sufficient quantity of germs (pathogens),
A rescuer susceptible to the germs (pathogens),
The germ (pathogen) is transmitted through the correct entry site.

Q. What may occur when a person touches an infected person's body fluids?

A. Direct contact transmission.

Q. What may occur when a person touches an object that has been contaminated with blood or body fluid from an infected person?

A. Indirect contact transmission.

Q. What may occur when a person inhales infected breaths when an infected person coughs or sneezes?

A. Airborne transmission.

Q. What may occur when a person is bitten by an animal, tick or another person?

A. Vector transmission.

Q. Which disease would cause swelling and blister-like sores around the lips and mouth?

A. Herpes.

Q. Which disease causes a severe infection of the brain and spinal cord?

A. Meningitis.

Q. Which disease most commonly affects the “respiratory system”?

A. Tuberculosis.

Q. Which disease causes a severe infection of the liver?

A. Hepatitis B.

Q. Which disease weakens a patient’s immune system and destroys a body’s ability to fight infections?

A. HIV-AIDS.

Q. What is correct concerning HIV-AIDS?

A. Cannot be spread by casual contact,
Easily killed by alcohol or chlorine bleach,
Transmitted through exposure to blood and particular body fluids.

Q. How can HIV-AIDS be transmitted?

A. Infected blood,
Infected semen,
Infected vaginal secretions,
Infected breast milk.

Q. What should be worn when a rescuer treats a patient?

A. Protective disposable gloves and safety glasses.

Q. To prevent disease transmission, what must always be used by a rescuer when performing CPR?

A. Resuscitation mask.

Q. What should you do if you think you may have been exposed to an infectious disease?

A. Notify your supervisor and involved medical personnel immediately.

Q. What occurs when a person becomes unconscious?

A. The tongue relaxes, falls to the back of the throat and blocks the airway.

Q. What does the RBB's of first aid represent?

A. Responsiveness, Breathing and Bleeding.

Q. What is the correct order of events that a rescuer should take at the scene of an emergency?

A. Survey the scene, check the patient, call for advanced medical help.

Q. A rescuer is treating a patient, and the scene suddenly becomes unsafe. What should a rescuer do?

A. Retreat to a safe distance.

Q. What organ is referred to as the center of consciousness?

A. Brain.

# RESPIRATORY EMERGENCIES

Respiratory emergencies - Treatment begins the same as all other emergency situations

1) Evaluate the scene for safety.
2) Check Responsiveness
3) Check breathing
4) Check bleeding

Respiratory distress - A patient who has breathing difficulty.

Respiratory arrest - A patient who has stopped breathing.

BREATHING PROCESS

1) Air enters the mouth and nose
2) Passes through the pharynx (throat)
3) Passes through the larynx (voicebox)
4) Passes through the trachea
5) Passes through bronchi and into the lungs

THE BRAIN IS THE CONTROL CENTER FOR BREATHING.

The brain adjusts the rate and depth of breathing based on the amount of oxygen and carbon dioxide in the blood.

BREATHING EMERGENCIES CAN BE CAUSED BY:

1) Obstructed airway (choking)
2) Illness such as pneumonia
3) Respiratory conditions such as emphysema, asthma, etc.
4) Electrocution
5) Shock
6) Drowning
7) Heart attack or heart disease
8) Injury to the chest or lungs
9) Allergic reactions, such as food, insects, poison ivy, etc.
10) Drugs (penicillin, etc.)
11) Poisoning (such as inhaling or ingesting toxic substances)

Respiratory distress is the most common type of breathing emergency.

The signs and symptoms of respiratory distress are usually obvious.

SIGNS AND SYMPTOMS OF RESPIRATORY DISTRESS:

1) Patients look like they cannot catch their breath
2) Patient may be gasping for air
3) Unusual breathing patterns
4) Unusual breathing noise
5) Initially, flushed (red) and moist skin
   Later, pale or bluish skin (especially lips, nail beds, toe beds)
6) Patient may feel dizzy or light-headed
7) Pain in the chest
8) Tingling in the hands and feet
9) Patient may be fearful, apprehensive

CYANOSIS - A bluish discoloration of the skin (lips, mouth, nail beds, etc. due to a lack of oxygen in the blood)

## TYPES OF RESPIRATORY DISTRESS

Causes of respiratory distress:

A) Injuries
B) Asthma
C) Emphysema
D) Hyperventilation
E) Anaphylactic shock (allergic reaction)

## INJURIES

### INJURIES

Injuries that affect any parts of the respiratory system may cause breathing problems (*Examples:* mouth, nose, throat, trachea, lungs, etc.)

### ASTHMA

Asthma is a condition that narrows the air passages and makes breathing difficult; wheezing when patient inhales; asthma attacks cause the air passages to become narrow, swell or become constricted.

Asthma is more common in children and young adults.

### EMPHYSEMA

Emphysema is a disease when the lungs lose their ability to exchange oxygen and carbon dioxide effectively.

Usually develops over several years and is often caused by smoking.

Patients may have:

1) Shortness of breath
2) Extreme difficulty when inhaling
3) Coughing, cyanosis or fever
4) Restlessness, confusion, weakness
5) Patients usually get worse over time

## HYPERVENTILATION

Hyperventilation occurs when a patient breathes faster than normal and causes an imbalance of the oxygen and carbon dioxide in the blood.

Usually caused by fear or anxiety.

Other causes are head injuries, severe bleeding, high fever, heart failure, lung disease, diabetic emergencies, asthma, exercise

Patients may have:

1) Rapid, shallow breathing
2) Patient feels they cannot get enough air and have feelings of suffocation
3) Fearful, apprehensive, confused, dizzy
4) Tingling or numbness feelings of the fingers and toes

## ANAPHYLACTIC SHOCK

Anaphylactic shock is a severe allergic reaction

The air passages swell, restricts a patient's breathing and may cause extreme breathing difficulty.

Anaphylactic shock may be caused by:

1) Insect stings (bees, wasps, etc.)
2) Contact with plants (poison ivy, etc.)
3) Medications (penicillin, etc.)

Known patients may carry an anaphylactic kit

Signs and symptoms of anaphylactic shock:

1) Rash and/or skin irritations
2) Feeling of tightness in the throat and/or chest
3) Swelling of the tongue, face and neck
4) Dizziness, confusion
5) Possible changes in consciousness

TREATMENT FOR RESPIRATORY DISTRESS

Evaluate and treat the RBB's

Ensure an open airway and adequate breathing

If patient is breathing, the heart is beating

Control severe bleeding

Notify advanced medical personnel (rescue squad, hospital, etc.) and begin planning to transport as soon as possible

Help the patient rest, reassure and make as comfortable as Possible.

Conduct a secondary survey after you have treated the RBB's
Assist the patient with prescribed medication such as oxygen, inhalant, allergic reaction kit, etc.

Maintain normal body temperature (keep the patient warm)
If a patient has signs of an injury or illness, call for advanced medical help immediately

If a patient's breathing is rapid and caused by excitement, emotions, etc., try to calm and slow the breathing rate. Encourage patient to breathe at a normal rate to prevent hyperventilation, unconsciousness, etc.

Unconscious patients are usually in a worse condition than a conscious patient. Do all you are trained to do to prevent unconsciousness.

## RESPIRATORY ARREST

The condition when a patient stops breathing.
Can be caused by illness, injury, obstructed airway, etc.

The body can function only for a few minutes without oxygen before body systems begin to fail.

Without oxygen, the heart muscle stops working and in turn, all the other body systems will fail.

## OROPHARYNGEAL AIRWAY:

The Tongue is the Most Common Cause of Airway Obstruction in Unresponsive / Unconscious Patients. The tongue is attached to the lower jaw and when a patient is lying down on their back, especially face – up, the lower jaw drops backward. The tongue, being attached to the lower jaw, drops back against the throat and blocks the airway. Any unresponsive patient, whether breathing or not has an Immediate life-threating condition.

An Oropharyngeal Airway is used to keep the airway open by holding the tongue away from the back of the throat.
An Oropharyngeal Airway can only be Inserted into a patient that does not have a “gag reflex. To test for a gag reflex, observe If a patient’s lower eyelid contracts (attempts to close) when you gently rub the upper eyelid. If so, then the patient has a gag reflex and you cannot insert an oral airway.

## (CPR) - CARDIOPULMONARY RESUSCITATION

CPR — Cardiopulmonary Resuscitation occurs when Breathing and Circulation have stopped - pulselessness in large arteries.

Why CPR? — Cases of cardiac arrest, electric shock, drowning, suffocation, drug overdose, automobile accidents, severe trauma that results in death.

How does CPR prevent death?

Clinical death - This condition is reversible and occurs when the heartbeat and breathing have stopped. CPR reverses this condition. Occurs in 6 minutes after breathing and circulation have stopped except in drowning, freezing temperatures, or infant situations.

Biological death - This condition is irreversible and results in permanent brain death due to lack of oxygen. This death is final.

Speed – Starting CPR is the key to saving lives and is a vital factor necessary for CPR to be successful.

Why is speed so important?

1. It could mean the difference between living and dying.
2. It could affect the patient's future quality of life

A person who receives CPR within four minutes has four times greater chances of surviving than those of a victim who did not receive CPR until after four minutes.

Always give the patient the benefit of the doubt and begin CPR immediately.

Give the patient the benefit of the doubt as to how long the state of cardiac arrest has been and start CPR immediately.

A rescuer who is qualified to perform CPR can make a difference whether a patient will live.

CPR performed properly results in only about one-third of normal blood flow to the brain

Action Plan for Heart Attack signals

Unknown Heart Disease

a. Recognize signals of a heart attack
b. Stop activity and rest
c. Wait 2 minutes to see if pain goes away
d. If pain does not go away in 2 minutes, make plans to get to the hospital

Known Heart Disease

a. Recognize signals of a heart attack
b. Stop activity and rest
c. Assist patient with oral nitroglycerin
d. If pain does not go away in 10 minutes, make plans to get to hospital.

Risk Factors and Prudent Heart Living

Risk Factors That Can Be Changed:

1. Cigarette smoking
2. High blood pressure
3. Cholesterol
4. Diabetes
5. Exercise
6. Stress

Risk Factors That Cannot Be Changed:

1. Heredity
2. Sex
3. Race
4. Age

Cigarette smoking, high blood pressure and high cholesterol level increase the risk of heart attack <u>five (5)</u> times greater than those who do not have these risks.

## RISK FACTORS

### Smoking (Effects)

a. Nicotine constricts blood vessel size resulting in an increased blood pressure.
b. Nicotine makes the heartbeat faster.
c. Carbon monoxide (inhaled in smoke) cuts down on amount of oxygen in blood.
d. Smokers are more likely to develop hardening of the arteries than nonsmokers.
e. Smokers are more than twice as likely to suffer a heart attack than a nonsmoker.

### High Blood Pressure (Contributing Factors)

a. Obesity
b. Smoking
c. High salt diet
d. Heredity
e. Emotions

### Uncontrolled high blood pressure affects:

a. Eyes
b. Nervous system
c. Kidneys
d. Heart (enlargement)

### Ways to control high blood pressure:

a. Maintain normal body weight
b. Decrease salty foods
c. Don’t smoke or drink
d. Take medication if prescribed

High Cholesterol intake

Cholesterol -Manufactured by the body and found in animal Fats. Contributes to hardening of the arteries

Ways to control cholesterol intake:

a. Avoid saturated fats.
b. Encourage use of polyunsaturated fats such as corn oil, soybean oil, fish, chicken and white meats, low-fat dairy products and more vegetable products.
c. Discourage use of saturated fat cooking oils, whole milk and dairy products, organ and red meats, egg yolks,shrimp and oysters.

Diabetes

Associated with obesity and chain reaction effects from obesity including:

a. Increased heart rate
b. Increased blood pressure
c. Increased risk of heart attack

The risk of heart attack in diabetic men is twice as great (women, three times as great) as for a non-diabetic.

Exercise

a. Improves circulation and efficiency of the heart and lungs.
b. The heart needs exercise as does all muscles of the body.
c. Cardiovascular fitness reduces the risk of heart disease.
d. A strong heart does not have to work as hard to circulate the blood demanded by the body.
e. Exercise promotes cardiovascular and body fitness and helps control obesity.
f. Exercise helps to alleviate emotional stress and strain.

Prudent heart living - Lifestyle that minimizes the risk of heart disease

a) Avoidance of cigarette smoking
b) Control of high blood pressure
c) Sensible nutrition
d) Weight control
e) Reduction of saturated fats and cholesterol
f) Get regular exercise
g) Avoid undue emotional stress and strain, if possible

## HEART ATTACKS

KEY TERMS:

Cardiac Arrest - A condition in which the heart has stopped or too weak to pump blood effectively

CPR - (Cardiopulmonary Resuscitation) A technique that combines rescue breathing and chest compressions to a patient whose breathing and heart have stopped

Coronary arteries - Blood vessels that supply the heart with blood

Heart attack - A sudden illness involving death of the heart muscle when it does not receive enough oxygen

Sternum - Breastbone

FIRST AID PRIORITIES (RBB'S)

1) R-Responsiveness
2) B - Breathing
3) B- Bleeding

The heart is located in the middle of the chest, behind the lower half of the sternum (breastbone).

The heart is divided into four chambers separated by valves in each half of the heart.

The coronary arteries supply the heart muscle with blood (oxygen).

Heart attack - Death of heart muscle

Heart attacks are usually caused by cardiovascular disease (cholesterol, hardening of the arteries, high blood pressure, etc.)

Heart attacks are the leading cause of death for adults in the United States.

SIGNS/SYMPTOMS OF A HEART ATTACK

Chest pain and discomfort (most notable symptom)

Unbearable crushing type pain felt in the chest and or back

Uncomfortable pressure, squeezing, tightness, aching, constricting or heavy sensation in the chest and or back.

Pain that may spread to the shoulder, arm, neck or jaw

Pain that is constant and usually not relieved by resting, changing position, or taking oral medication

Breathing difficulty

Pale or bluish skin color around the face

Sweating (may be profuse in some patients)

Changes in pulse rate

Patient denial of the seriousness of the signs/symptoms

ANGINA PECTORIS - Pain that a patient has that has coronary artery disease. This pain usually lasts less than 10 minutes.

Nitroglycerin is usually prescribed for these patients. This medication is usually placed under the tongue when these patients have chest pain.

## TREATMENT FOR A HEART ATTACK

1) Recognize the signals of a heart attack
2) Have the patient stop what they are doing and rest (try to make as comfortable as possible)
3) Help the patient rest comfortably
4) Attempt to obtain information about the patient's condition from other people at the scene
5) Call for advanced medical help (Rescue Squad, etc.)
6) Assist with medication, if prescribed
7) Give 1 adult aspirin or 2 to 4 baby aspirin if not allergic
8) Conduct a secondary survey and monitor vital signs
9) Be prepared to give CPR if the patient's heart stops beating

Ask the following questions to a conscious patient that has persistent chest pain:

a) When did the pain start?
b) What brought the pain on?
c) Does anything lessen the pain?
d) What does it feel like?
e) Where does it hurt?
f) Have you ever had this pain before?
g) Have you ever had any type of heart problems?
h) What type of medication do you take?

## CARDIAC ARREST

Cardiac arrest - When the heart stops for whatever reason (heart attack, accident, trauma, electrocution, etc.)

## TREATMENT OF CARDIAC ARREST

A patient's heart will continue to beat for 3 to 4 minutes when a patient stops breathing. Blood and oxygen will still be getting to the brain.

A patient will breathe only a couple times if the heart stops. Blood and oxygen stop flowing to the brain immediately.

Clinical Death - A patient's breathing and heart have stopped.

The brain and other vital organs will continue to live for a few minutes until the oxygen in the blood is used up.

CPR - Keeps the patient's brain supplied with oxygen until the patient receives advanced medical care (EMT's, paramedics, doctors, hospital).

Without CPR, the brain will begin to die within 4 to 6 minutes, except in some special situations (cold environment, drowning, etc.)

## QUESTIONS FOR REVIEW

## Respiratory Emergencies

Q. What are signs of respiratory distress?

A. Unusually fast, slow, deep or shallow breathing,
Unusual wheezing or gurgling sounds,
High pitched crowing sound.

Q. What does a pale or bluish skin color indicate?

A. Low oxygen level in blood.

Q. What is the condition called that causes a patient's skin such as the nail
beds of the fingers or toes to have a blue color?

A. Cyanosis-a lack of circulating oxygen.

Q. What is the primary concern that a rescuer should have for a patient that has a severe allergic reaction?

A. The airway may swell and restrict a patient's breathing.

Q. Which of the following may cause a breathing emergency?

A. An obstructed airway,
Electrocution,
Heart attack or allergic reaction,
Chest or lung injury.

Q. Why does the tongue cause an airway obstruction in an unconscious patient?

A. The patient's tongue falls backward toward the back of the throat blocking the airway.

Q. What is an oropharyngeal airway used for?

A. To keep the tongue positioned away from the back of the throat.

Q. When can an oropharyngeal airway be inserted in a patient?

A. Only in unconscious patients.

Q. How does a rescuer select the proper size of an oropharyngeal airway?

A. Measure as the same length from the corner of the mouth to the tip of the earlobe.

Q. An Oropharyngeal Airway should be Inserted before a rescuer begins using a resuscitation mask while performing CPR. What is correct as related to a rescuer Inserting an Oropharyngeal Airway?

A. Can only be inserted in unresponsive / unconscious patients who does not have a gag reflex. Test for a gag reflex by gently rubbing a patient's upper eyelid. if patient's lower eyelid contracts (Attempts to Close), then the patient has a gag reflex and you cannot insert an oral airway.

## QUESTIONS FOR REVIEW

### CPR Heart Attacks

Q. What is the leading cause of death of adults in the United States?

A. Heart attacks due to cardiovascular disease.

Q. What is the key symptom and usually the most prominent symptom of heart attack?

A. Chest pain and or back pain.

Q. What are symptoms of heart attack pain?

A. Uncomfortable pressure, squeezing sensation in the chest and or back,
Tightness, aching, constricting heavy sensation in the chest and or back,
Pain felt in the center of the chest behind the sternum that may spread to the shoulder, arm, neck or jaw.

Q. What are symptoms of a heart attack?

A. Pain that is constant and usually not relieved by resting or changing positions,
Pain that is usually not relieved by taking oral medication,
Pain that may radiate to the shoulder, arm, neck, jaw or back.

Q. What are signs or symptoms of a heart attack?

A. Difficulty breathing,
Bluish skin color particularly around the face,
Perspiration from the face and body, often profuse sweating.

Q. What is usually associated with angina pain?

A. Pain that usually lasts less than 10 minutes,
Oral medication that usually relieves the pain,
Stopping physical activity to allow the oxygen supply and demand to balance that usually relieves the pain.

Q. What is the first thing that should be done when a rescuer feels a patient may be having a heart attack?

A. Have the patient stop all activities and rest in the position most comfortable.

Q. You respond to a medical emergency scene, and you observe a responsive/conscious, talking patient that has persistent chest pain and is sweating profusely. You suspect that the patient is having a heart attack. You ask the patient if they are allergic to aspirin and their response is no. What is the 2015 revised field recommendation for treating a responsive / conscious, talking patient suspected of having a heart attack and is not allergic to aspirin?

A. Give patient aspirin to chew and swallow. Give One (1) Adult Aspirin (325 mg) or Two (2) to Four (4) Baby Aspirins (81 mg), if patient is not allergic to aspirin.

Q. Which of the following best describes clinical death?

A. Condition when the heart stops beating and breathing stops.

Q. What is the primary sign of cardiac arrest?

A. Absence of signs of life (breathing, movement, etc.).

Q. What is described as irreversible damage caused by brain death?

A. Biological death.

Q. How does CPR increase a patient's chances of survival?

A. Keeps the brain supplied with oxygen until the patient receives advanced medical help.

Q. How much blood flow to the brain does CPR provide, even when performed to perfection?

A. About one third as much as the heart normally creates.

Q. What are major risk factors that can be controlled to help reduce the risks of heart attacks?

A. Smoking,
High blood pressure,
High blood cholesterol.

## WOUNDS-SOFT TISSUE INJURIES AND BURNS

There are two types of wounds---Open and Closed

Open - Break in the skin
Closed - (Bruise) Skin is not broken

4 types of open wounds:

1. Abrasion - Skin is rubbed or scraped away
2. Laceration - Skin and tissue cut from something that results in a smooth or jagged edge
3. Avulsion - A portion of skin or tissue partially or completely torn away
4. Amputation - A complete severing of a body part.

Puncture Wounds- The skin, tissue, etc. is pierced with a pointed object such as a knife, bullet, piece of metal, etc.

Impaled object - An object remains embedded in an open wound

Puncture wound - Most dangerous of all open wounds due to risk of infection.

DRESSINGS AND BANDAGES

All open wounds need some type of covering to help control bleeding and prevent infection.

DRESSINGS: Sterile to help prevent infection and used to help control bleeding

Example: 2 inch x 2 inch gauze pads, 4 inch x 4 inch gauze pads, and other materials wrapped in individual containers and classified as sterile

Universal dressing - Large dressings, 12 inches x 24 inches, etc.

BANDAGE: Triangular bandage, etc. used to hold dressings in place, slings and swathes

Bandage compress - A thick gauze dressing attached to a gauze bandage

Roller bandage - Commonly called roller gauze, Kling gauze, etc. that sticks to previous layer

Elastic bandage - Ace bandage or elastic wrap

APPLYING A BANDAGE AND DRESSING

1. Elevate the injured part above the heart, if practicable
2. Completely cover all dressings with a bandage and tie in place
3. Never cover fingers or toes, if possible, to evaluate if the bandage has been tied too tight and to evaluate circulation
4. If blood soaks through a dressing, apply more dressings and bandage unless it is life-threatening bleeding. If life-threatening bleeding then once blood soaks through the second dressing, discard that dressing and replace it with a fresh one.
5. If you have applied a dressing to treat a sucking chest wound to control active bleeding, then you remove the blood - soaked dressing and apply dry dressing.

TREATMENT FOR CLOSED WOUNDS:

1. Direct pressure, and elevation help to control bleeding and swelling.
2. Cold (ice packs, cold packs, etc.) can be used to help control pain and swelling

TREATMENT FOR OPEN WOUNDS:

1. Never waste time trying to wash a wound
2. Control bleeding with direct pressure, elevation, pressure point, etc.

Completely severed body parts - Wrap in a sterile gauze and place in a plastic bag on ice or cold pack. Try to keep cold but do not freeze. Never place amputated parts directly in water to keep cool.

IMPALED OBJECTS:

1. Never remove impaled objects unless it involves the cheek and interferes with breathing
2. Use bulky dressings to stabilize in place
3. Control bleeding by bandaging dressings in place around the object

BURNS:

The severity of a burn depends on:

1. Temperature of the source of the burn
2. Length of exposure to the source
3. Location of the burn
4. Extent of the burn
5. Patient's age and medical condition

CLASSIFICATIONS OF BURNS

1. Superficial - A burn of the outer skin (sunburn), reddened skin
2. Partial Thickness - A partial thickness burn that has blisters and is red
3. Full Thickness - A full thickness burn that destroys both layers of skin, tissue, muscle, nerves, etc.
   Burn area appears brown or black with a charred appearance, tissue may have a white color

IDENTIFYING CRITICAL BURNS

Critical burns are life threatening.

1. Burns causing breathing difficulty or signs of burns around the mouth and/or nose
2. Burns covering more than one body part
3. Burns to the head, neck, hands, feet or genitals
4. Any partial or full thickness burns of a child or elderly person
5. Burns resulting from chemicals, explosions or electricity
6. Inhaling hot steam or other hot vapors

## TREATMENT FOR THERMAL BURNS

1. Evaluate the scene for personal safety
2. Remove the patient from the source of heat contact.
   May include extinguishing flames or remove smoldering or smoking clothing from a patient.
3. Do a primary survey
   Pay particular attention to soot or burns around the mouth, nose or face. These burns must be treated as life-threatening because the airway or lungs may have been burned also.

### Basic Steps for Treating Thermal Burns

Cool the burned area
Cover the burned area with sterile material
Treat for shock

### Cooling a burned area:

Be sure to remove the source of heat
Cool with large amounts of water
For large areas of the body or body parts that can not be put in water, apply sheets or other large material and apply water

### Covering a burned area:

After pain is relieved, apply dry, sterile dressings and bandage loosely
Never apply burn ointments, oil, butter, etc.
Never break blisters

### Treat for shock:

Shock is caused by pain and a loss of body fluids
Put the patient in a shock position except when breathing or head injuries are present
Maintain patient body temperature by keeping patient warm

SPECIAL SITUATIONS:

Chemical Burns:
Caused by acids, alkalis, bleach, drain cleaners, etc.

Treatment: Remove the chemical from the skin as fast as possible by flushing with large amounts of water. Remove contaminated clothing from the patient.

Chemical burns of the eyes:

Flush the affected eye outwards (away from the nose) with large amounts of water.

Electrical Burns:

The body tissue, etc. has resistance and causes heat when electrical current flows through the body.
Such heat causes electrical burns along the flow of current.

The severity of an electrical burn depends on:

1. Type and amount of current
2. The current path through the body
3. How long the current passed through the body

Treatment:

Check and treat possible entrance and exit wounds
Cover burn areas with dry, sterile dressings.

Lightning Injuries:

Look for and treat life-threatening conditions such as respiratory or cardiac problems

Suspect spinal injuries and do not move until stabilized on a spine board

## QUESTIONS FOR REVIEW

### Wounds-Soft Tissue Injuries and Burns

Q. Which of the following would be the most serious effect of electrical current passing through the body?

A. Effects on the brain and heart that control breathing and heartbeat.

Q. What type patient would be treated as serious?

A. An unconscious patient that has received an electrical shock and has an irregular heartbeat and rapid, shallow breathing.

Q. A bruise is classified as what type of wound?

A. Closed wound.

Q. Which of the following is the most common open wound that results in skin rubbed or scraped away?

A. Abrasion.

Q. What is a cut from a sharp object that results in smooth or jagged skin edges?

A. Laceration.

Q. What results when skin or tissue is partially or completely torn away and may be hanging like a flap?

A. Avulsion.

Q. What results when a body part is completely torn or cut from the body?

A. Amputation.

Q. What type wound is created when a nail, knife or splinter penetrates the skin and soft tissue and the area closes around the object?

A. Puncture.

Q. Why are puncture wounds dangerous?

A. Because nerves are always damaged in puncture wounds.

Q. What is an impaled object?

A. An object that remains embedded in an open wound.

Q. Why do all open wounds need dressings and bandages applied?

A. To help control bleeding and prevent infection.

Q. What is used to absorb blood, prevent infection and must always be sterile?

A. Dressings.

Q. A Patient has a sucking chest wound and is bleeding from the wound Site. You have applied a gauze pad and direct pressure to control the bleeding. The gauze pad becomes soaked with Blood. What should a Rescuer do now?

A. Remove the blood soaked dressing and apply a new dressing.

Q. What are used to hold dressings in place and to apply pressure to help control bleeding?

A. Bandages.

Q. Which are general rules for applying a bandage?

A. Elevate injured body parts above the level of the heart if injuries permit,
Never cover the fingers or toes, if possible, to leave exposed,
Bandages help support an injured area.

Q. Why are fingers or toes left exposed, if possible, when applying dressings and bandages?

A. So the rescuer can evaluate as to whether or not a bandage has been tied too tight and to evaluate circulation.

Q. A rescuer has applied a splint with bandages to a suspected, fractured lower leg. The patient's toes turn blue. What has happened and what should the rescuer do?

A. The bandage is too tight and it should be loosened slightly.

Q. What should a rescuer do if blood soaks through dressings and bandages applied to an open thigh wound?

A. Leave the bandages in place and apply additional dressings and bandages.

Q. What precaution should be taken when a rescuer applies ice or a cold pack to a closed wound?

A. Place a gauze pad or other cloth between the skin and ice or cold pack.

Q. A rescuer responds to an accident scene and finds a patient with an amputated (completely severed) hand. The rescuer has treated and stabilized the patient's RBB's. What should the rescuer do with the amputated hand?

A. Place the amputated hand in a plastic bag and keep cool by placing the plastic bag on ice, cold pack, etc.

Q. A Person has an impaled object in the chest. During your initial assessment, you observe that the patient is unresponsive / unconscious and not breathing. You need to start CPR immediately. How should you treat this patient that requires CPR and has an impaled object in the chest?

A. Remove the impaled object only if the object interferes with performing CPR. Otherwise begin CPR. Stabilize the impaled object in place and control bleeding by placing bulky dressings around the object.

Q. What is required when treating an impaled object?

A. Use bulky dressings to stabilize the object in place,
Avoid movement of the object to prevent more tissue damage,
Control bleeding by placing dressings and bandages around the object.

Q. What affects the severity of a burn?

A. Temperature of the source of the burn,
Length of exposure to the burn source,
Location and extent of the burn,
Patient's age and medical condition.

Q. How does the depth of a burn affect the severity of the burn?

A. The deeper the burn, the more severe it is.

Q. Which type of burn involves only the top layer of skin and usually only causes reddened skin (sunburn)?

A. Superficial Burn

Q. Which type burn is a partial thickness burn that causes the skin to be red and has blisters?

A. Partial Thickness Burn

Q. Which type burn is a full-thickness burn that has a “charred” brown or black appearance and involves muscles, fat tissue, nerves and bones?

A. Full Thickness Burn

Q. Which type burns would be classified as serious burns?

A. Burns causing breathing difficulty,
Signs of burns around the mouth or nose,
Burns covering more than one part of the body.

Q. Which type burns would be classified as serious burns?

A. Burns to the head, neck, hands, feet or genitals,
Any partial or full-thickness burn of an elderly person,
Burns caused by chemicals, explosion or electricity.

Q. After evaluating the scene for personal safety, what should a rescuer do next at the scene of a burn patient that is conscious?

A. Remove the patient from the source of heat (extinguish clothes on fire or remove smoking, smoldering clothing).

Q. Which type burn is always serious and may cause a breathing problem?

A. Burns around the mouth, nose, or face.

Q. Why are burns of the mouth, nose or face classified as serious burns?

A. Because the air passages or lungs may have been burned causing swelling or stopped breathing.

Q. How should small first degree (superficial) burns be treated?

A. Cool the burn area with large amounts of cool water.

Q. On what type of burn can ice or ice water be properly applied to?

A. Superficial Burns

Q. What is the treatment for burns?

A. Cover the burned area to keep air out and help reduce pain,
Always use sterile dressings to stabilize a burn area,
Bandages should be applied loosely.

Q. What is very important to help minimize shock in a burn patient?

A. Maintain normal, patient body temperature by keeping the patient warm because burn patients tend to chill and go into shock.

Q. How should chemicals (battery acid, hydraulic oil, brake fluid, etc.) spilled into the eyes of a conscious patient be treated?

A. Flush the affected eye with large amounts of water, from the nose outward to protect the unaffected eye.

Q. What may occur with electrical burns?

A. Electrical burns are often deep,
Electrical burns may have an entry and exit wound,
Electrical burns may cause severe tissue damage even though skin burns may be all that are visible.

Q. What should a rescuer always suspect in a patient struck by lightning?

A. Life threatening conditions (respiratory and cardiac arrest) and spinal injuries.

Q. What is considered as “general treatment of open wounds”?

A. Treat and stabilize the RBB’s,
Control bleeding,
Be as sterile as possible to reduce the risk of infection.

# BLEEDING

Bleeding is either internal or external.

Internal bleeding is often difficult to recognize.

Uncontrolled bleeding, whether internal or external is life-threatening.

Severe bleeding is life-threatening and must be treated during the primary survey. RBB's - Responsiveness, Breathing, and Bleeding.

Clotting - The process by which blood thickens at a wound site. Normal clotting takes place in about 10 minutes.

BLOOD VESSELS

a – Arteries Carry oxygen-rich blood away from the heart (bright red in color and spurts from an open wound)

b - Veins: Carry blood back to the heart from the organs and tissue (dark, bluish red in color and flows steady from an open wound)

c - Capillaries: Small blood vessels where the exchange of oxygen and carbon dioxide takes place (oozes from an open wound).

External bleeding - occurs when a blood vessel is opened externally

Signs of Severe External Bleeding:

1 - Blood spurting from a wound
2 - Blood that fails to clot after you have taken all measures to control bleeding.

Bleeding from arteries is rapid, profuse and is life-threatening.

Arterial bleeding is under direct pressure from the heart and spurts from an open wound with each heartbeat.

Arterial blood is bright red in color because it contains a high concentration of oxygen.

Arterial bleeding is harder to control than venous bleeding.

Controlling External Bleeding:

Direct pressure: Applying pressure with your hand. Most external bleeding can be controlled with direct pressure.

Pressure bandage: A bandage applied to control bleeding.

Hemostatic Dressing: a dressing which contains a clotting agent

Tourniquet: A tight band placed around the arm or leg to stop blood flow to a wound.

To Control External Bleeding:

1 - Place direct pressure on the wound with a sterile gauze pad or clean cloth. Apply firm pressure over the gauze pad or clean cloth. Push Hard using your body weight.

2 - Apply a pressure bandage. This bandage will hold the gauze pad or cloth in place while maintaining direct pressure.

3. If bleeding does not stop with the application of direct pressure, then apply a tourniquet.

4. A Hemostatic dressing may also be used when applying direct pressure to control bleeding. The dressing is coated with a clotting agent to help stop bleeding

Preventing Disease Transmission When Controlling Bleeding:

1 - Avoid contacting a patient's blood, both directly and indirectly by using examination gloves, safety glasses, etc.
2 - Avoid eating, drinking or touching your mouth, nose, or eyes while providing care before washing your hands.
3 - Always wash your hands thoroughly after providing care, even if you wear gloves, etc.

INTERNAL BLEEDING:

Internal bleeding - Bleeding into spaces inside the body.

Severe internal bleeding -Will produce signs and symptoms similar to shock.

Signs and Symptoms:

Discoloration of the skin, bruising in the injured area
Tender, swollen or firm tissues that are normally soft
Anxiety or restlessness
Rapid weak pulse
Rapid breathing
Skin that feels cool or moist or looks pale or bluish
Nausea and vomiting
Excessive thirst
Declining level of consciousness
Drop in blood pressure

Controlling Minor Internal Bleeding:

Apply ice or a chemical cold pack to the injured area to help reduce pain and swelling.
When applying ice, place a gauze between the source of cold and the skin.

Controlling Serious Internal Bleeding:

Stabilize the patient immediately and plan to transport to the hospital as quickly as possible
Protect the patient from further harm
Monitor the ABC's and vital signs
Help the patient rest in the most comfortable position
Maintain normal body temperature by keeping the patient warm
Reassure the patient
Continue providing care for other conditions

## QUESTIONS FOR REVIEW

### Bleeding

Q. When is severe bleeding controlled in a patient?

A. After checking for signs of life during the primary survey.

Q. What are signs of severe external bleeding?

A. Bleeding that spurts from an open wound,
Bleeding that spurts from an open wound and is bright red in color,
Bleeding that fails to clot after a rescuer has taken all measures to control it.

Q. Why is bleeding from an artery usually more serious than bleeding from a vein or capillary?

A. Blood in arteries travel faster and is under more pressure that causes loss of blood quickly.

Q. Clotting associated with minor bleeding usually occurs within:

A. 10 minutes.

Q. What are characteristics of bleeding from arteries?

A. Bleeding that spurts from an open wound and is bright red in color,
Bleeding that is often rapid and profuse,
Bleeding that is life threatening.

Q. Why does arterial bleeding from an open wound have a bright red color?

A. Because of the high concentration of oxygen.

Q. What is the first method that should be used to control external bleeding?

A. Direct pressure.

Q. What is the correct order when treating external bleeding from the arms and or legs, when bleeding is not life – threatening?

A. Direct pressure with sterile dressing and constricting bandage
Use a tourniquet if direct pressure is not effective or first choice if patient has already lost a substantial amount of blood when you arrive at the scene.

Q. What is described as a tight band placed around an arm or leg to control bleeding and is rarely used because it can cause damage and loss of a limb?

A. Tourniquet.

Q. What should a rescuer do if blood soaks through dressings and bandages that have been applied to an open wound that is not life threating ?

A. Add additional dressings and bandages on top of the blood soaked ones.

Q. What helps a rescuer reduce the risk of disease transmissions when controlling bleeding?

A. Avoiding contacting a patient's blood if possible,
Avoiding eating or drinking or touching your mouth, nose or eyes while providing patient care,
Always wash your hands thoroughly after treating a patient, even if protective gloves were worn.

Q. What type of bleeding is the most difficult to recognize?

A. Internal bleeding.

Q. What type injuries will eventually produce signs and symptoms similar to shock?

A. Severe internal bleeding.

Q. What is very often the first indication that an injured patient with severe chest injuries may have severe internal bleeding?

A. Restlessness and anxiety.

Q. What are signs or symptoms of severe internal bleeding?

A. Anxiety and restlessness,
Rapid, weak pulse,
Rapid breathing,
Moist, pale, cool skin,
Nausea and vomiting,
Swollen, tender or firm tissues associated with injuries of the abdomen,
Excessive thirst,
Declining level of consciousness,
Bruising discoloration of the skin.

# SHOCK

Shock: A life-threatening condition that occurs when the circulatory system fails to provide adequate oxygenated blood to all parts of the body.

Vital Organs: Heart, Lungs and Brain

The signs and symptoms of shock are a series of responses by the body to maintain adequate blood flow to the vital organs.

Three conditions are necessary to maintain adequate blood to all body parts:

1 - The heart must be working well
2 - An adequate amount of blood must be circulating in the body through blood vessels
3 - The blood vessels must be intact and able to adjust blood flow

When either one of the three is not in proper working condition, shock develops because the body cannot meet its demands for oxygen through the failure of adequate circulation.

REMEMBER: Shock is a life-threatening condition

Signs and Symptoms of Shock:

1 - Restlessness or irritability (usually occurs first)
2 - Rapid and weak pulse
3 - Rapid breathing
4 - Pale or bluish, cool, moist skin
5 - Excessive thirst
6 - Nausea and vomiting
7 - Drowsiness and loss of consciousness
8 - Drop in blood pressure

Types of Shock:

Anaphylactic Shock - Life threatening allergic reaction to a substance, food, bee sting, etc.

Cardiogenic Shock - Failure of the heart to pump effectively, heart attack, cardiac arrest, etc.

Hemorrhagic Shock - Severe loss of blood associated with serious bleeding or loss of blood plasma associated with burns; occurs with internal or external wounds or burns.

Metabolic Shock - Loss of body fluids through vomiting, diarrhea or a heat illness.

Neurogenic Shock - Failure of the nervous system to control the size of blood vessels causing them to dilate; occurs with brain, spinal cord or nerve injuries.

Psychogenic Shock - Fainting, temporary loss of adequate blood to the brain

Respiratory Shock - Failure of the lungs to transfer oxygen into the blood; occurs with respiratory distress, obstructed airway, collapsed trachea, respiratory arrest, etc.

When Shock Occurs:

The body will prioritize its needs for blood by ensuring adequate blood flow to the vital organs.
The body (nervous system) does this by reducing the amount of blood circulating to the less important body parts such as the arms, legs and skin.
Blood from these less important organs are diverted to the vital organs - Heart, Brain and Lungs

The body attempts to compensate for inadequate blood flow to the vital organs by speeding up the heart and breathing rates.

Anticipate that shock will be present in some degree with all injuries to the body. Always anticipate and start treating for shock before signs and symptoms develop.

Treatment for Shock:

1 - Evaluate and treat the RBB's (Responsiveness, Breathing, and Bleeding In the primary survey.
2 - Perform a secondary survey and start treatment for shock.

General Shock Treatment:

1 - Protect the patient from further injury
2 - Monitor the RBB's and provide treatment for any airway, Responsiveness, Breathing or Bleeding problems
3 - Help the patient rest comfortably. Pain increases stress on the body and accelerates the effects of shock
4 - Help the patient maintain normal body temperature by keeping the patient warm
5 - Reassure the patient
6 - Provide care for specific injuries or conditions

Further Treatment to Help Manage Shock:

Control external bleeding as soon as possible to minimize blood loss

Never give the patient anything to eat or drink, even though they may be extremely thirsty.

Stabilize the patient on a backboard and transport as quickly and safely as possible.

Never wait for shock to develop before beginning to prepare to treat.

Anticipate that shock will develop with all injuries and plan to treat after life-threatening conditions (primary survey) and a secondary survey have been completed.

QUESTIONS FOR REVIEW

## SHOCK

Q. You are treating patient suspected of having severe internal bleeding who is responsive and responds to verbal stimuli The patient wakes up every few minutes and is begging for something to drink. What should the rescuer do?

A. Never give such injured patients anything to drink.

Q. What describes shock?

A. A condition in which the circulatory system fails to circulate oxygen-rich blood to all parts of the body.

Q. What are the conditions necessary to maintain adequate blood flow?

A. A patient's heart must be working well,
An adequate amount of blood must be circulating in the body,
The blood vessels must be intact and able to adjust blood flow.

Q. Which type shock is associated with a severe allergic reaction to a substance, food, medication, etc.?

A. Anaphylactic shock.

Q. Which type shock is associated with severe bleeding or loss of blood plasma?

A. Hemorrhagic shock.

Q. Which type shock is associated with obstructed airway, respiratory distress or respiratory arrest?

A. Respiratory shock.

Q. Which type shock is associated with failure of the nervous system to control blood vessel size (brain or spinal cord injuries)?

A. Neurogenic shock (nerve shock).

Q. Which type shock is associated with a heart attack or cardiac arrest?

A. Cardiogenic shock.

Q. Why does the skin of a patient in shock appear pale, cool and moist?

A. Because the body reduces the blood circulating to the arms, legs and skin and increases blood flow to the vital organs (heart, lungs, brain).

Q. What does prolonged shock usually cause in a patient?

A. Cyanosis (bluish discoloration of the skin, lips, nailbeds, etc.).

Q. What is associated with shock?

A. Shock is a life-threatening condition,
The first sign of shock is usually patient restlessness,
Nausea and vomiting.

Q. What are signs or symptoms of shock?

A. Pale, bluish, cool, moist skin,
Rapid breathing,
Rapid heart rate,
Excessive thirst,
Drowsiness or loss of consciousness,
Nausea and vomiting.

Q. When should shock treatment begin for a patient?

A. After treating the RBB's.

Q. What is general treatment for treating a patient in shock?

A. Monitor and treat the RBB's,
Help the patient rest comfortably to help minimize pain,
Maintain normal, patient body temperature (keep the patient warm).

Q. What would help a rescuer manage the effects of patient shock?

A. Control any external bleeding as soon as possible,
Never give a patient anything to eat or drink, regardless of thirst or hunger,
Reassure the patient and keep the patient talking if possible

Q. What is very important to remember about shock?

A. Never wait for shock to develop before beginning to treat for shock,
Anticipate that some degree of shock will develop with all types of injuries or illness,
Always begin treating for shock before signs and symptoms develop,
The key to managing shock effectively is recognizing when shock may develop and give proper treatment.

Q. What conditions may cause serious shock?

A. When the vital organs (heart, lungs, brain do not receive adequate oxygen rich blood),
Uncontrollable external bleeding,
Internal bleeding usually associated with serious chest and abdominal injuries.

Q. How does the heart react when a patient suffers a severe injury or sudden illness that affects the flow of blood to all body parts?

A. The heart beats faster and stronger at first.

Q. A rescuer responds to the scene of an emergency where an unconscious patient is observed to be in shock. What should a rescuer do after surveying the scene and checking the patient?

A. Call for advanced medical help (rescue squad, etc.).

## MUSCULOSKELETAL INJURIES-BONE AND JOINT INJURIES

Key Terms:

Dislocation - Displacement of a bone end from its normal position at a joint.

Fracture - A break in a bone.

Joint - A location where two or more bones are joined.

Ligament - A fibrous band that connects bone to bone.

Sprain - Excessive stretching and tearing of ligaments, cartilage, and other soft tissue.

Strain - Excessive stretching and tearing of muscles and tendons.

Sign - Something that a rescuer sees or feels (cyanosis, deformity of a joint etc.).

Symptom - Something that a patient tells you (my arm hurts, I can't feel my fingers and toes).

Tendon - A fibrous band that connects muscle to bone.

Angulated - Bent at an abnormal or odd angle.

MUSCLES:

Muscles are soft tissue that attach to bones, which shorten and lengthen that are responsible for bodily movement.

Muscles are anchored to bones by tendons.

Each muscle is controlled by nerves that originate in the brain, travel through the spinal cord and end at each muscle.

Paralysis - A loss of muscle control, loss of sensation and ability to feel.

SKELETON:

The skeleton is formed by over 200 bones.
The skeleton gives form and shape to the body and protects vital organs.
The skull protects the brain.
The ribs protect the heart and lungs.
The spinal cord is protected by the bones of the spinal column.

Ligaments - Connect and hold bones together at joints

Bones are hard, dense tissues that support the weight of the body.
Bones store and produce red blood cells.
Bone injuries are painful and do bleed.

JOINTS:

A joint is a location where 2 bones come together.

Ligaments - Strong, tough, fibrous tissue that connect bone-to-bone at a joint.

Joints are surrounded by ligaments and some joints allow for more movement than others.

TYPES OF MUSCULOSKELETAL INJURIES:

1) Fracture - A break in a bone

Open Fracture - A fracture associated with an open wound

Open fractures are more serious than closed fractures due to external bleeding and infection risks

Closed Fracture - A fracture associated with a closed wound

Few fractures are life-threatening, although a fracture of a large bone may cause shock because bones and tissue, muscle, etc. can bleed heavily.

Dislocation - A separation of a bone end from its normal position at a joint

Common Dislocations: Fingers, shoulders, elbow

Dislocations are generally more obvious than fractures because the joint appears deformed (deformity is a tell-tale sign of a dislocation with an injury located at a join

Sprain - Stretching and tearing of ligaments, cartilage and other soft tissue
Sprains are associated with a joint injury.

Mild sprains that only stretch ligaments are not serious and usually heal quickly.

Strain - Stretching and tearing of muscles and tendons, usually called a pulled muscle.

Strains most commonly affect the neck, lower back and thigh muscles.

SIGNS AND SYMPTOMS OF MUSCULOSKELETAL INJURIES:

NOTE: A rescuer can always compare the injured side or limb to an uninjured side or limb to help evaluate an injury.

Common signs and symptoms of musculoskeletal Injuries:

1 - Pain
2 - Swelling
3 - Deformity
4 - Discoloration of the skin (caused by blood leaking into tissue)
5 - Inability to use the affected part, normally

Pain, swelling and discoloration commonly occur with any significant injury.

Deformity:

Marked deformity is a sign of a fracture or dislocation.

Examples:

Deformity associated with a joint is usually caused by a dislocation.

Deformity associated with an injury located along the length of a long bone such as the radius (forearm) is usually caused by a fracture.

Specific signs and symptoms of a musculoskeletal injury:

Sprains and strains are easy to tell apart.
Sprains are associated with a joint.
Strains are associated with muscles.

Signs and symptoms of a serious injury:

1) Significant deformity
2) Moderate or severe swelling and discoloration
3) Inability to move or use the affected body part
4) Bone ends extending through an open wound
5) Patient feels bone ends rubbing together (grating) or a patient felt or heard a snap or pop at the time of the injury
6) Loss of circulation or feeling in an extremity
7) Cause of the injury suggests the injury may be serious

Stabilize and transport quickly and safely to the hospital if the following conditions are present:

1) The injury involves severe bleeding
2) The injury involves the head, neck or back
3) The injury impairs walking or breathing
4) You see or suspect multiple musculoskeletal injuries

General care for musculoskeletal injuries:

1) Rest
2) Ice
3) Elevation

Rest - Avoid any movements or activities that cause pain (pain causes shock). Help the patient find the most comfortable position and stabilize in that position, if possible.

If you suspect head or spinal injuries, leave the patient lying flat.

Ice - Applications of cold (ice packs, cold packs, etc.) should be applied to sprains, strains, dislocations or closed fractures.

Never place cold applications directly over or on an open fracture. Cold applications can be placed around an open fracture site.

Immobilization OF musculoskeletal injuries:

A rescuer must always immobilize an injured area before giving additional care such as applications of cold or elevation.

IMMOBILIZE - Splinting or securing a patient to prevent movement of injured parts.

Reasons to immobilize:

Reduce pain
Prevent further damage to soft tissues
(Splinting and securing may help prevent a closed fracture from becoming an open fracture)
Reduce the risk of serious bleeding
Reduce the possibility of loss of circulation or loss of feeling to an injured area
Prevent closed fractures from becoming open fractures

Splint - A device that maintains an injured part in place

Follow these 4 basic principles when splinting:

Splint without causing more pain and discomfort to the patient.
Splint an injury in the position you find it.
Splint the injured area and joints above and below the injury site.
Check for proper circulation and sensation before and after splinting
(circulation - capillary refill)
(sensation - feeling, movement)

If splinting of a part causes circulation or sensation impairment, loosen the splint.

Types of Splints:

1) Soft splints - Folded blanket, pillow, towel, folded clothing, sling, swathe, (all are soft material)
2) Rigid splints -Spine boards (backboards), wire ladder splints, plastic boards, cardboard, etc. (all are firm, rigid like material)
3) Anatomic splint - Using the body to secure another part of the body.

HOW TO SPLINT: General Guidelines

1) Check the RBB's (Responsiveness, Breathing, Bleeding) and vital signs
2) Support the injured part. Have someone support the injured part, both above and below the injured area.
3) Cover open wounds with dressings and bandages.
4) If an injury involves an extremity, check for circulation and sensation at a site below (distal to) the injury, both before and after splinting
5) Pad rigid splints for comfort.
6) Secure splints with triangular bandages.
7) Recheck circulation below the injury site, after splinting, to ensure circulation has not been restricted by applying a splint too tightly
8) Elevate the splinted part, if possible.
9) Recheck the RBB's and vital signs.
10) Treat for shock

## QUESTIONS FOR REVIEW

### Musculoskeletal Injuries-Bone and Joint Injuries

Q. What is common to most musculoskeletal injuries?

A. Such injuries are usually painful,
Such injuries are rarely life-threatening,
Such injuries can result in permanent disability or death if not recognized and treated properly.

Q. What affects the control of muscles?

A. Injuries to the brain,
Injuries of spinal cord,
Injuries of nerves.

Q. What is associated with paralysis?

A. Loss of muscle control,
Loss of ability to feel,
Sensation absent or affected.

Q. What tissue holds bone ends in place at joints and connects bone to bone?

A. Ligaments.

Q. What is a fracture?

A. A break in a bone.

Q. What are common factors associated with an open fracture?

A. Open fractures are more serious than closed fractures,
Open fractures always involve an open wound,
Open fractures are more serious than closed fractures because of blood loss and infection risks.

Q. What is correct as related to fractures?

A. Few fractures are life-threatening.

Q. What will usually be present with fractures?

A. Absent feeling distal to the injury,
Open wound,
Pain.

Q. What will usually be associated with a fracture?

A. Bleeding from an open fracture,
Pain,
Shock.

Q. What is a general guideline for splinting fractures?

A. Splint the injured area and immobilize the joints above and below the injury site.

Q. What describes a dislocation?

A. A displacement or separation of a bone from its normal position at a joint.

Q. Why is a dislocation usually more obvious than other types of injuries?

A. Deformity of the joint and/or limb.

Q. Why is a patient unable to move a dislocated joint?

A. The bone ends are out of place and usually the joint locks in a deformed position.

Q. What is a general rule for splinting dislocations?

A. Splint in the position found.

Q. What are the reasons for splinting a fracture or dislocation?

A. To lessen pain,
To prevent damage to soft tissues, including muscle, nerves and blood vessels,
To reduce the risk of serious bleeding.

Q. What is described as the stretching or tearing of ligaments and other soft tissues at a joint?

A. Sprain.

Q. What type injuries may result in deformity?

A. Dislocated elbow,
Compound femur fracture,
Dislocated shoulder.

Q. What is usually associated with a strain?

A. Sometimes called a muscle pull
Usually involves the neck, thigh or lower back,
Usually the result of overexertion or heavy lifting.

Q. When are musculoskeletal injuries identified and treated?

A. During the secondary survey.

Q. What can a rescuer do to help evaluate an injury?

A. Compare the injured side or limb to an uninjured side or limb.

Q. What are common signs and symptoms of a musculoskeletal injury?

A. Pain,
Swelling,
Deformity and discoloration of the skin,
Inability to use the affected part normally.

Q. What causes swelling?

A. Bleeding from damaged blood vessels and tissue.

Q. What would usually cause deformity of the arm?

A. Dislocated or fractured elbow.

Q. When should a rescuer suspect a serious injury?

A. When significant deformity is present,
When a patient cannot use or move the affected body part,
When bone ends are protruding from an open wound or a patient feels bones ends rubbing together (grating),
When a patient loses circulation or feeling in an extremity.

Q. If a rescuer suspects a patient has head or spine injuries, how should the patient be positioned?

A. Leave the patient lying flat, log roll onto a spineboard and stabilize.

Q. What are the most Important reasons for stabilizing and splinting suspected fractures and or dislocations?

A. To prevent further damage and injury to blood vessels, ligaments, nerves and muscle tissue

Q. What are the reasons for immobilizing (splinting) an injury?

A. To prevent closed fractures from becoming open fractures,
To help reduce the possibility of loss of circulation to an injured part,
To reduce the risk of serious bleeding,
To reduce pain and prevent further damage to soft tissue, blood vessels, nerves, etc.

Q. What is associated with a splint?

A. A splint maintains an injured part in place,
A splint is used to immobilize an injured part,
To effectively immobilize an injured part, a splint must extend, beyond the joints both above and below a fracture site.

Q. What are the general rules of splinting?

A. Splint without causing more pain or discomfort to the patient,
Splint injuries (fractures, dislocations, etc.) in the position found,
Splint the injured area and the joints above and below the injury site, if possible,
Check for proper circulation and sensation, both before and after splinting.

Q. What should a rescuer do if a splint applied to the leg causes a loss of circulation and sensation in the toes?

A - Loosen the splint because it has been applied too tight.

Q. What are classified as soft splints?

A. Folded blanket.
Pillow.
A sling.

Q. What should be done when splinting an injured body part?

A. Support the injured part while splinting, if possible,
Cover open wounds with dressings and bandages to help control bleeding and prevent infection,
In extremity injuries, check for circulation and sensation distal to the injury,
Check for a distal pulse, feel the hand or foot for warmth or check for capillary refill in the fingers or toes.

Q. A rescuer has applied a splint to the forearm and the patient starts complaining of numbness and tingling in the fingers. What should the rescuer do?

A. Loosen the splint.

Q. What are good general guidelines as related to musculoskeletal injuries?

A. When in doubt, splint,
Always treat all injuries as serious,
Treat and stabilize patients at the location found unless the safety of the rescuer or patient is threatened.

Q. What would be associated with fractures of large bones?

A. Severe bleeding,
Shock,
Severe pain.

## INJURIES OF THE HEAD AND SPINE

Head Injuries:

Head injuries can affect the brain.
Head injuries that damage the brain may cause changes in consciousness.

Spine Injuries:

The spine is a strong column that supports the head and trunk.
The spinal cord and (network of nerves leading to all parts of the body from the brain) extends from the base of the brain through the spinal column.
The spinal column consists of vertebrae with disks between each vertebra which have a space where nerves branch out to all parts of the body.

The spine is divided into 5 regions:

1) Cervical region (neck)
2) Thoracic region (chest)
3) Lumbar region (lower back)
4) Sacrum region (pelvis)
5) Coccyx region (tailbone)

Injuries to the spine may fracture vertebrae, sprain ligaments, compress or cut the spinal cord.
Spinal cord damage may cause temporary or permanent paralysis or even death.

Always consider the cause of the injury (mechanism of the accident) to help evaluate whether a head or spinal injury is suspected.

Secure the scene and evaluate the forces that caused the injury. Strong forces are likely to cause severe injury to the head and spine.

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Serious head and or spine injuries:

1) A fall
2) A person found unconscious for unknown reasons and all unconscious patients with trauma
3) Any injury involving severe blunt force to the head and/or trunk
4) Gunshot wounds
5) Any accident that involves a lightning strike

Signs and symptoms of head and spinal injuries:

1) Changes in the level of consciousness
2) Severe pain or pressure in the head or spine
3) Tingling, numbness or loss of sensation in the extremities
4) Partial or complete loss of movement of any body part
5) Unusual bumps or depressions on the head or spine
6) Blood or clear, oily looking fluid draining from the ears, nose or head wound)
7) Profuse external bleeding of the head or spine
8) Seizures
9) Impaired breathing or vision as a result of injury
10) Nausea or vomiting (Head injury patients tend to vomit)
11) Persistent headache
12) Loss of balance
13) Bruising of the head, especially around the eyes and behind the ears (Raccoon eyes - Bruising around the eyes)
(Battle signs - Bruising of the bone behind the ears)

Raccoon eyes and/or battle signs indicate a fracture of the base of the skull

Treatment of serious head and spine injuries:

1) Head and spine injuries can become serious, life-threatening emergencies.
2) Serious head or spine injuries can cause a patient to stop breathing.
3) The treatment for serious and spine injuries must always include supporting the respiratory, circulatory and nervous systems (ABC's of first aid).

Treatment of head and spinal injuries:

1) Minimize movement of the head and spine
2) Maintain an open airway (use the jaw thrust)
3) Control external bleeding
4) Monitor vital signs
5) Maintain normal body temperature
6) If oxygen is available, then administer oxygen

Minimizing movement of the head and spine

Be very careful - Movement of an injured head or spine can cause irreversible damage to the spinal cord.
Stabilize patient and secure to a backboard in the area found, if at all possible (safe scene, etc.)

Situations where you would not move a patient's head in line with the body

1. When the patient's head is severely angled to one side.
2. When the patient complains of pain, pressure, or muscle spasms in the neck when you begin to align the head with the body.
3. When the rescuer feels resistance when attempting to move the head in line with the body.

Secure and immobilize the patient to a backboard

A patient should be log-rolled to place on a backboard - while using at least three people (one to stabilize the head and at least two, preferably to roll. Secure the patient to the backboard using 12 to 15 triangular bandages, secured sufficiently to be able to turn the spine board, with patient, on it's side if the patient vomits.

Secure the patient's head to the backboard using a folded or rolled blanket, securing the forehead with a folded triangular bandage.

Recheck the RBB's

Insure an open airway
Monitor the vital signs after immobilizing
Pay close attention to the patient's level of consciousness and breathing
A serious head injury will often cause changes in consciousness. Does the patient responds to the 3W's (Who, Where, What-Who they are, where they are, what they were doing when the accident occurred).

Head or spine injuries can cause paralysis of the diaphragm and/or chest muscle nerves that control breathing muscles - thus breathing may be affected or stop.

Maintain normal body temperature by keeping the patient warm.
Do not overheat - Monitor the patient closely.

Care for specific head injuries

Concussion

Concussion - a temporary impairment of brain function. Concussions usually only cause loss of consciousness for a brief period of time, if unconscious at all

Scalp Injury

Scalp bleeding can be minor or severe. Never put direct pressure on a scalp injury if you feel a depression, spongy area or bone fragments

Cheek Injury

Control bleeding as other types of bleeding, although you must control on the outside as well as the inside of the cheek.

Impaled objects in the check - Remove only to control bleeding and to maintain an open airway.

Nose Injury

Nose injuries are usually caused by a blow from a blunt object. Treating bleeding from the nose - Have the patient lean forward, pinch the nostrils together and apply cold applications to the bridge of the nose and/or applying pressure on the upper lip just beneath the nose.

Nose injury precautions:

1. After controlling bleeding - Tell the patient to avoid rubbing, blowing or picking the nose.
2. Never attempt to completely stop bleeding from the nose if a serious head injury (skull fracture is suspected). Completely stopping the above type bleeding will cause pressure to build up in the brain.

Bleeding or fluid draining from the nose associated with a head injury - should be controlled by applying a loose dressing

Eye Injury

Eye injuries may involve the eyeball, bone or soft tissue surrounding the eye.
Injuries that penetrate the eyeball or cause the eye to be removed from its socket are very serious and can cause blindness.

Never put direct pressure on the eyeball

Treatment for impaled object in the eye:

1) Place the patient on their back, if they feel comfortable (Remember to make the patient as comfortable as possible)
2) Never attempt to remove any impaled object (stuck) in the eye
3) Place a sterile dressing around the object
4) Stabilize any impaled object in place as best you can. Stabilize with a paper cup to support the object.
5) Apply a bandage around the cup to stabilize
6) Apply bandages to both eyes to prevent sympathetic eye movement (both eyes open and close together-this prevents pain when the injured eye blinks and contacts the impaled object).

Treatment of foreign bodies in the eye:

Dirt, sand, metal slivers, etc. on the surface of the eyeball are very irritating. The eye produces tears while attempting to flush out such objects.

Treatment of such objects in the eye - Flushing the eye with water or eye wash solution (away from the bridge of the nose) will usually remove such objects.

If such objects cannot be removed by flushing, transport to a medical facility.

## Ear Injury

Ear injuries may involve the outer tissue of the ear or the eardrum.

Blood or other oily-like, fluid draining from the ear may be present with a serious head or spine injury

Never attempt to stop this drainage with direct pressure Cover the ear lightly with a sterile dressing.

## Mouth, Jaw and Neck Injuries

Injuries in these areas may cause breathing problems, airway obstruction due to bleeding, broken teeth, swollen or fractured trachea.

Mouth injuries with no serious head injury - place the patient in a seated position and tilt the head slightly forward.

If knocked out teeth are involved, save for possible reinsertion.

Jaw injuries - Evaluate whether seriousness may indicate a possible serious head or spine injury.

Maintain an open airway, check the mouth for bleeding, etc. Minimize movement of the head and neck (possible spine injuries if the situation appears serious)

Neck injuries
Be cautious - The following critical body parts are located in the neck area - trachea (windpipe), carotid arteries, cervical (neck) part of the spine.

Neck injuries may cause severe bleeding and swelling that may obstruct the airway.
Treat all neck injuries as if a serious spine injury is present.
Neck injuries can fracture the trachea, causing airway obstruction. This situation requires immediate stabilization and transportation.
Neck injuries may involve bleeding from the carotid arteries

Summary of head and spinal injuries:

1. Always consider the cause of the injury (mechanism of the accident) to decide whether an injury is serious.
2. The cause is usually the best indicator of whether an injury to the head or spine should be considered serious.
3. Stabilize as if you suspect a serious head or spine injury, if you have any doubts about the seriousness.
4. Minimize movement of the injured area if you suspect a serious head or spine injury.
5. Stabilize and secure the patient to a backboard at the location found if possible and the area is safe to do so.

## QUESTIONS FOR REVIEW

### Head and Spine Injuries

Q. What are correct statements as related to head or spine injuries?

A. Brain tissue, bones or the spinal cord may be damaged,
It is usually difficult to determine the extent of damage in head and spine injuries,
A possible change in the level of consciousness,
Always provide initial care as if the injury is serious and spinal cord is unstable.

Q. What is the first and most important sign of a serious head injury?

A. An altered or change in the level of consciousness.

Q. What should be used by a rescuer to evaluate whether a patient has received a head or spine injury?

A. Consider the cause of the injury (mechanism of the accident),
Survey the scene and evaluate the forces involved in the injury,
Strong forces are likely to cause injury to the head or spine.

Q. What are the most important priorities of treatment for patients with suspected serious head Injuries?

A. Monitoring responsiveness and evaluating breathing
and Controlling bleeding. Accurately treating suspected spinal injuries and administering oxygen and transporting

Q. An unconscious patient was hit in the head with a sledgehammer. How should a rescuer open the airway?

A. Jaw thrust first. If not effective, then use the head tilt chin lift

Q. Two equipment operators have rammed into each other. One operator is complaining of tingling and loss of sensation in the legs. How should the patient be treated?

A. Stabilize for a spinal injury (backboard).

Q. What may be present with a serious head injury?

A. Blood or other fluids draining from the ears or nose,
Serious external bleeding from the head,
Severe pain or pressure in the head or spine.

Q. What type injury results in bruising and discoloration around the eyes and/or behind the ears?

A. A serious head injury.

Q. An unconscious patient injured in a slip and fall accident has blood and greasy/oily-like fluid draining from the ears and nose. What is the correct treatment?

A. Apply a loose sterile dressing and stabilize for a spine injury.

Q. A patient fell 10 feet from on top of a surface building and is complaining of loss of sensation and loss of ability to move the legs. What is the correct treatment?

A. Stabilize on a backboard and monitor the RBB's.

Q. A piece of metal, 10 feet in length, fell and struck a person in the head and neck area. The patient is unconscious. How should a rescuer open the airway?

A. jaw thrust first then if not effective use the head tilt chin lift

Q. A responsive / conscious patient has been injured in a roof fall accident and has obvious, open wound injuries to the front and top of the head. The Patient does not speak, move, or blink, but does respond to painful stimuli. The patient has suspected spinal injuries. The rescuer verifies that the patient is breathing normal at this time. What should be the next treatment for this patient?

A. Control Bleeding, stabilize and support the head and neck while absolutely minimizing any movement except to the extent necessary to secure on a backboard. Monitor breathing very closely. Prepare to give Oxygen - Oxygen is critical for patients with head injuries

Q. What would be signs or symptoms of a head or spine injury?

A. Pain in the neck,
Pain in the spine,
Seizures.

Q. What should a rescuer do if ever in doubt as to whether a spinal injury may have been caused by the accident?

A. Stabilize on a backboard, even when in doubt.

Q. An unconscious patient has head injuries. The RBB's have been treated and stabilized. What should the rescuer do next?

A. Stabilize on a backboard and elevate the head end of the backboard.

Q. What is the correct treatment for immobilizing a patient with a suspected spinal injury?

A. If possible, keep the head and spine secured
The application of a blanket roll (horseshoe shape) around the head, secured to the backboard, Immobilized on a backboard.

Q. A patient has a scalp wound with external bleeding. The rescuer sees bone fragments at the injury site. What should be done by a rescuer?

A. Examine the injured area very carefully,
Apply only slight pressure with a sterile gauze around the wound. Be careful not to apply direct pressure too close to the wound area.

Q. When is the only time that a rescuer is allowed to remove an impaled object?

A. In the cheek, only when necessary to control bleeding and to keep the airway open and in the chest when it interferes with performing CPR

Q. A patient has an impaled object in the cheek. The rescuer attempts to remove the impaled object to keep the airway open but this attempted removal results in extreme pain for the patient. What should the rescuer do?

A. Leave the object in place and stabilize in place with bulky dressings and bandages.

Q. What is the proper treatment for a nosebleed?

A. Have the patient sit with the head leaning slightly forward while pinching the nostrils together.

Q. What should be avoided after a nosebleed has been controlled?

A. Rubbing the nose,
Blowing through the nose,
Picking the nose.

Q. What is the proper treatment for a patient that has a piece of wood impaled in the eye?

A. Place a sterile dressing around the object and stabilize as best you can with a paper cup and bandage both eyes to prevent sympathetic eye movement.

Q. What is the proper treatment for a patient that has chemicals, acids, etc. splashed in the eyes?

A. Flush with large amounts of water or eye wash solution (away from the unaffected eye, if applicable).

Q. A patient has a small piece of metal lying on the surface of the eyeball. A rescuer attempts to wash out the metal but is unsuccessful. What should the rescuer do now?

A. Dress the injured eye and uninjured eye as well and transport to the doctor.

Q. A patient has injuries to both eyes. How should a rescuer treat?

A. Cover both eyes with sterile dressings and transport.

Q. What is the proper treatment for a patient that has dirt in the eye?

A. Rinse the eye with water and if not removed, transport to the doctor.

Q. What should be a rescuer's primary concern when a patient has an injury to the mouth, jaw or neck?

A. Ensuring an open airway and adequate breathing.

Q. What may be related to injuries of the front part of the neck?

A. Suspected possible spine injury,
Suspected fractured trachea (windpipe),
Suspected bleeding and swelling that may obstruct the airway.

Q. When would a rescuer suspect a spinal injury?

A. An unconscious patient involved in a fall accident,
A strong blunt force that struck the head,
An unconscious patient that fell off a building.

## INJURIES OF THE CHEST, ABDOMEN AND PELVIS

### Injuries to the chest

The chest contains the heart, major blood vessels and lungs. The 12 pairs of ribs help protect the vital organs.

Chest injuries are the second leading cause of trauma deaths each year.

Chest wounds may be open or closed.

Signs and symptoms of serious chest injuries:

1) Difficulty breathing
2) Pain at the site of injury that increases with deep breathing or movement
3) Deformity, such as that caused by a fracture
4) Flushed, pale or bluish discoloration of the skin
5) Coughing up blood

Rib fractures:

A simple rib fracture is rarely life-threatening.
A patient with a rib fracture may have shallow breathing because normal or deep breathing is painful.

A patient with a rib fracture will usually lean toward the side of the fracture and press a hand or arm over the injured area.

Serious rib fractures can be life-threatening.

Flail Chest:

Fractured ribs that do not move normally with the rest of the chest during breathing. The flail segment moves in the opposite direction as the rest of the chest during breathing.

Treatment for rib fractures:

1) Have the patient rest in a position that will make breathing easier.
2) Binding the patient's arm to the chest on the injured side will help support the injured area and make breathing more comfortable
3) A pillow or rolled blanket applied against the injured area can be used to help support and immobilize the injured area.

Chest puncture injuries:

Puncture wounds to the chest may be life-threatening.

A puncture wound that penetrates the lung or chest cavity surrounding the lung may allow air to enter the chest. This prevents the lungs from functioning properly.

Treatment for chest puncture injuries:

Sucking chest wound - A penetrating chest injury that allows air to enter the chest cavity and a sucking sound can be heard coming from the wound each time the patient breathes. This is a very serious injury.

NOTE: The primary concern for a sucking chest wound is breathing problems.

To treat a sucking chest wound – Leave open if no bleeding is present. If bleeding is present, cover with sterile dressing, If dressing becomes saturated, remove and replace with a fresh dressing

# INJURIES TO THE ABDOMEN

The abdomen is the area immediately under the chest and above the pelvis.

The liver, spleen and stomach are organs in the abdomen that are easily injured and bleed profusely when injured.

The abdomen has 4 quadrants with the navel serving as the reference point:

Quadrants - Upper left, Upper right, Lower left, Lower right

The liver is located in the upper right quadrant, is rich in blood and injuries to the liver can quickly be fatal.

The spleen, which stores blood, located in the upper left quadrant, is easily damaged and also, like the liver, bleeds profusely when injured.

The stomach, located mostly in the upper left quadrant, can bleed severely when injured.

Signs and symptoms of abdominal injuries:

1) Severe pain
2) Bruising
3) External and/or internal bleeding
4) Nausea and vomiting (sometimes vomit containing blood)
5) Pale, moist skin
6) Weakness
7) Thirst
8) Pain, tenderness or a tight feeling in the abdomen
9) Organs, possibly protruding from the abdomen

Treatment for open abdominal injuries

1) Carefully position the patient on the back
2) Do not apply direct pressure
3) Do not push organs back in
4) Remove clothing from around the wound
5) Apply moist, sterile dressings loosely over the wound
6) Cover dressings loosely with plastic wrap
7) Cover dressings with a folded towel or large trauma dressing to maintain warmth
8) Maintain normal body temperature (keep the patient warm)
9) Stabilize and secure to a backboard and transport as quickly and safely as possible

Treatment for closed abdominal injuries:

1) Carefully position the patient on the back
2) Do not apply direct pressure
3) Bend the patient's knees slightly. This releases the abdominal muscles to relax. Place rolled-up blanket under the patient's knees. If movement of the patient's legs causes pain, leave the legs straight
4) Treat for shock. Maintain normal body temperature by keeping the patient warm
5) Stabilize and secure to a backboard and transport as quickly and safely as possible

# INJURIES TO THE PELVIS

The pelvis contains the urinary bladder, sex organs, and lower portion of the large intestines.

Arteries and nerves pass through the pelvis.

The organs within the pelvis are well protected on the sides and back but not in the front.

Signs and symptoms of pelvic injuries:

1) Similar to those of abdominal injuries
2) Loss of sensation in the legs
3) Loss of ability to move the legs
   (Both #2 and #3 may indicate an injury of the lower spine)

Treatment of pelvic injuries:

1) Treat for the same way as abdominal injuries
2) Never move the victim until stabilized and secured to a backboard, if possible. The situation dictates if you can treat in the location found and if the area is safe
3) Keep the patient lying flat on their back
4) Keep the patient as comfortable as possible
5) Control external bleeding
6) Cover any protruding organs
7) Maintain normal body temperature (keep the patient warm)
8) Stabilize and secure to a backboard and transport as quickly and safely as possible.

Stabilize and secure on a backboard because always suspect a spinal injury when a pelvis injury is suspected.

Genital area injuries:

These injuries are extremely painful.
Treat as for other wounds.
Be careful to avoid embarrassment to the patient.

Summary of chest, abdomen, and pelvis injuries

1) These injuries can be serious and life-threatening
2) Treat all life-threatening conditions, first, as always, RBB's
3) Treat specific injuries
4) Stabilize, secure and transport as quickly and safely as possible

## QUESTIONS FOR REVIEW

### Chest, Abdomen, Pelvis Injuries

Q. What would be signs or symptoms of a serious chest injury?

A. Difficulty breathing,
Pain at the site of the injury,
Pain that increases with deep breathing or movement,
Coughing up blood,
Flushed, pale or bluish discoloration of the skin,
Pain that increases with deep breathing.

Q. What would be associated with rib fractures?

A. Shallow breathing,
Pain in the rib area,
Patient leaning forward and pressing a hand or arm over the injured area.

Q. How should rib fractures be treated?

A. Place a blanket against the injured area, secure with two triangular bandages, and bind the patient's arm to the chest with a sling and swathe to help support the injured area.

Q. A Patient has an open chest wound that is suspected to be a sucking chest wound. The patient is responsive / conscious and does not speak, move or blink. But respond to painful stimuli. What is the recommended treatment for a "sucking chest wound?

A. Leave wound open unless external bleeding needs to be controlled. Apply a loose, sterile dressing over the open wound and apply direct pressure. Replace dressing with new one if it becomes saturated

Q. Where is the liver located in the abdomen?

A. Upper right quadrant.

Q. Where is the spleen located in the abdomen?

A. Upper left quadrant.

Q. As related to abdominal injuries, what does the liver, spleen and stomach have in common?

A. All three organs are rich in blood, bleed seriously when injured causing shock signs and symptoms.

Q. What are signs or symptoms of a serious abdominal injury?

A. Severe pain,
Bruising,
External bleeding,
Nausea and vomiting (vomit may contain blood),
Pale, moist skin,
Thirst,
Pain, tenderness or a tight feeling in the abdomen,
Organs possibly protruding from the abdomen,
Nausea and vomiting (vomit may contain blood).

Q. What is the proper treatment for an open abdominal wound with protruding organs?

A. Carefully position the patient on their back,
Remove clothing from around the wound,
Apply moist, sterile dressings loosely over the wound.

Q. What is the proper treatment for an open abdominal wound with protruding organs?

A. Cover with moist sterile dressings loosely over the wound

Q. What is the proper treatment for a closed abdominal injury?

A. Carefully position the patient on their back,
Bend the patient's knees slightly, place rolled up blankets under the knees to allow the abdomen muscles to relax (If leg movement causes pain, leave legs straight),
Treat for shock (keep the patient warm).

Q. How should impaled objects in the chest or abdomen be treated?

A. Stabilize the impaled object in place with bulky dressings, bandages, etc. Only remove if it interferes with CPR

Q. How should a patient with a pelvis injury be stabilized?

A. On a backboard.

Q. A patient was hit in the pelvis when a steel belt rope broke and whip lashed toward the patient. The patient has lost feeling and sensation in the legs and cannot move the legs. What is the proper treatment?

A. Stabilize and secure to a backboard where found if the scene is safe.

Q. What should a rescuer also suspect if a patient has a pelvis injury?

A. Possible injury to the lower spine.

Q. Which organs are located in the chest cavity?

A. Heart,
Lungs,
Major blood vessels.

# INJURIES OF THE EXTREMITIES

Injuries to the extremities are common.

Prompt treatment can help prevent further damage and pain.

General treatment:

1) Insure adequate breathing and RBB's
2) Control bleeding
3) Support and immobilize the injured extremity
4) Elevate, if practicable, after splinting if such elevation does not cause pain
5) Monitor vital signs
6) Treat for shock - Maintain normal body temperature by keeping patient warm. Help make the patient as comfortable as possible.
7) Transport in a safe manner

Signs and symptoms of serious extremity injuries:

1) Pain
2) Tenderness
3) Moderate or severe swelling
4) Discoloration
5) Significant deformity of a limb
6) Inability to move or use an injured limb
7) Severe external bleeding

## Upper extremity injuries

The upper extremities include the arms, hands, collarbone, shoulder blade and shoulder.

The upper extremities are the most commonly injured areas of the body.

Minimize movement of any seriously injured upper extremity.

Never change the position if a patient is holding an injured arm against the chest. Holding the arm in this position is an effective immobilization.

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### Shoulder injuries:

The shoulder consists of the collarbone, shoulder blade and upper arm (humerus), and shoulder joint.

#### Collarbone

The most common injured bone of the shoulder is the collarbone, usually the result of a fall.

A patient with a fractured collarbone will usually hold the arm against the chest.

A sling and swathe on the injured side can be used to splint a collarbone injury.

#### Shoulder blade

Shoulder blade injuries are not common.

The patient may have extreme pain and may not be able to move the arm.

Splint the arm in position found, usually with a sling and swathe on the injured side.

Shoulder joint

Dislocations are common shoulder injuries.

Shoulder dislocations are painful and can be identified by the deformity present. These patients will try to minimize the pain by holding the arm in the most comfortable position.

Treatment for shoulder injuries:

1) Check and treat RBB's
2) Control external bleeding (direct pressure, etc.)
3) Check for circulation and sensation in the hands and fingers.
4) Splint in the position found (The patient will be holding the arm in the most comfortable position. Splint in this position.
5) Splint with a sling and swathe.
6) Recheck for circulation and sensation
7) Apply cold applications (cold packs, etc.) to help reduce swelling and pain.
8) Treat for shock (keep the patient warm)
9) Monitor RBB's.

Upper arm injuries:

The upper arm contains the bone that extends from the elbow to the shoulder.

A fracture of the upper arm may damage blood vessels and/or nerves.

Upper arm fractures are very painful and a patient usually cannot use that arm.

Treatment for upper arm injuries:

1) Check and treat RBB's
2) Control external bleeding (direct pressure, etc.)
3) Check for circulation and sensation in the hand and fingers
4) Immobilize the upper arm from the shoulder to the elbow
5) Splint with a sling and swathe
6) Recheck for circulation and sensation
7) Apply cold applications
8) Treat for shock (keep the patient warm)
9) Monitor RBB's

Elbow injuries:

The elbow can be sprained, fractured or dislocated.

Injuries to the elbow can cause permanent disability because nerves and blood vessels go through the elbow.

Treat all elbow injuries as very serious.

Elbow injuries can be made worse by movement.

Treatment for elbow injuries:

1) Check and treat RBB's
2) Control external bleeding (direct pressure, etc.)
3) Check for circulation and sensation in the hand and fingers
4) Immobilize the arm from the shoulder to the wrist
5) Splint in the position found
6) Recheck for circulation and sensation

Forearm, wrist, and hand injuries:

The forearm is the area from the elbow to the wrist and contains two forearm bones.

A forearm fracture may cause severe bleeding and/or loss of movement in the wrist and hand.

The hands are commonly injured because of everyday use. Serious injuries may damage nerves, blood vessels and bones.

Treatment for forearm, wrist, and hand injuries:

1) Check and treat RBB's
2) Control external bleeding (direct pressure, etc.)
3) Check for circulation and sensation in the hand and fingers

Air Splints

Air splints are also an effective way to immobilize the hand and forearm.

Be very careful when applying an air splint so as not to increase pain for the patient.

Proper inflation of an air splint:

A rescuer should be able to make a slight dent in the splint surface with your thumb.
A change in air temperature affects the air and splint tightness of an air splint.
Moving from a cold area to a warm area will cause an air splint to expand and get tighter.
Moving from a warm area to a cold area will cause an air splint to loosen.
Continuously check inflation of an air splint.
Continuously monitor and recheck circulation and sensation in the fingers if you apply an air splint.

Immobilize the injured part with a sling and swathe if moving the arm to a (sling-swathe) position does not cause pain.

Forearm injury treatment:

1) Check and treat RBB's
2) Control external bleeding
3) Check for circulation and sensation in the hands and fingers
4) Place a rigid splint underneath the forearm, extending beyond the hand and elbow.
5) Place a roll of gauze or similar material in the palm of the hand to maintain fingers in a normal position.
6) Apply a triangular bandage both above and below the injury site.
7) Recheck circulation and sensation.
8) Apply a sling and swathe.
9) Elevate the injured area if possible
10) Apply cold applications
11) Treat for shock
12) Monitor RBB's

Wrist, hand, and fingers treatment:

1) Check and treat RBB's
2) Control external bleeding
3) Check for circulation and sensation in the hands and fingers
4) Immobilize wrist, hand and finger injuries with a soft splint (gauze and triangular bandages)
5) Splint injured fingers to an adjacent finger with tape
6) Recheck circulation and sensation
7) Apply a sling and swathe to the injured hand side
8) Elevate the injured area if possible
9) Apply cold applications
10) Treat for shock
11) Monitor RBB's

## Lower extremity injuries

### Thigh, knee, and lower leg injuries:

#### Thigh Injuries

The bone in the thigh (femur) is the largest bone in the body.

A femur fracture usually produces a deformity.

Treatment of a thigh injury:

1) Check and treat RBB's
2) Control external bleeding (direct pressure, etc.)
3) Check for circulation and sensation in the foot and toes
4) Immobilize in the position found
5) Splint and secure to a backboard
6) Recheck for circulation and sensation
7) Apply cold applications (cold pack, etc.) to help reduce swelling and pain
8) Treat for shock (keep the patient warm)
9) Monitor RBB's

Knee injuries:

The knee joint is very vulnerable to injury and consists of the lower end of the thigh (bone), upper ends of the lower leg bones, and the kneecap.

Knee injuries range from cuts, bruises, sprains, fractures and dislocations.

Treatment for knee injuries:

1) Check and treat RBB's
2) Control external bleeding (direct pressure, etc.)
3) Immobilize
4) Splint with long leg rigid splinting material. (Long wooden board on outside - short wooden board on inside) Secure on a backboard. A long leg air splint or blanket (pillow) material can be used to stabilize an injured knee depending on position of the leg, knee and patient position.
5) Recheck for circulation and sensation.
6) Apply cold applications (cold pak, etc.)
7) Treat for shock (keep the patient warm)
8) Monitor RBB's

Ankle and foot injuries:

Ankle and foot injuries are common and range from sprains and dislocations.

Treat all ankle and foot injuries as serious.

Treatment for ankle and foot injuries:

1) Check and treat RBB's
2) Control external bleeding
3) Check for circulation and sensation
4) Immobilize with available splints
5) Splint and stabilize on a backboard
6) Recheck for circulation and sensation
7) Apply cold applications (cold pak, etc.) to help reduce swelling and pain.
8) Treat for shock (keep the patient warm)
9) Monitor RBB's

# TRANSPORTATION OF PATIENTS

## STABILIZING FOR TRANSPORTATION

Always remember:

Stabilize patients before moving unless necessary to move for your or the patient's safety. When in doubt, always splint before moving.

Always evaluate the cause of the accident and determine if a patient may have a suspected neck or spinal injury.

Always treat patients with serious head injuries as though they have a neck (spinal) injury.

Patients with any type of serious head, chest, abdomen, pelvis or leg injuries should be secured on a backboard. Other patients that have signs and symptoms of shock should also be secured to a backboard.

Always secure a patient to a backboard with a sufficient number of triangular bandages (usually 15 to 20) such that the backboard and patient can be turned on its side to allow for drainage, if a patient vomits.

A patient with a suspected spinal injury must be adequately secured to a backboard such that if the backboard is turned on its side, that the patient will remain in a neutral in-line, secure position.

## Preventing injury during transportation

Be sure you have adequately secured and stabilized a patient before you begin transportation.

Never get in too big a hurry while transporting a patient.

Your objective is to safely transport a patient without causing further injuries. The worst thing that can happen is to cause more patient injuries.

## QUESTIONS FOR REVIEW

### Upper Extremity Injuries

Q. What is important information as related to splinting upper and lower extremity injuries?

A. Splint in the position found,
Injuries may damage blood vessels, tissues, nerves, muscle
Very few extremity injuries are life-threatening.

Q. How can a rescuer splint for a suspected collarbone injury?

A. Apply a sling and swathe on the injured arm side to support the arm and hold it against the chest.

Q. A patient has a suspected dislocated shoulder and is holding the arm away from the chest. How should a rescuer stabilize?

A. Splint in the position found. Place a rolled blanket in the space between the arm and chest and apply a sling and swathe.

Q. A patient has a shoulder injury. When should circulation and sensation in the hand and fingers be checked?

A. Both, before and after splinting.

Q. What is important information as related to elbow injuries?

A. Injuries to the elbow can cause permanent disability,
All nerves and blood vessels to the forearm and hand go through the elbow,
Injuries to the elbow can be made worse by movement.

Q. What is important information as related to elbow injuries?

A. When a patient says that they cannot move the elbow, never attempt to move in any manner, Splint in the position you find it, Check for circulation and sensation in the hand and fingers both before and after splinting.

Q. What is important information as related to a fracture of the forearm?

A. Check for circulation and sensation in the fingers both before and after splinting,
Apply a rigid, wooden board splint or an air splint and leave the fingers exposed,
Apply a sling and swathe after applying an air splint or wooden board splint.

Q. What is correct treatment for a suspected fractured or dislocated finger?

A. Splint to an adjacent finger.

Q. When applied, how much air is required to properly inflate an air splint?

A. Inflate until you can make a slight dent in the surface of the splint with your thumb.

Q. In July, an air splint has been applied to a patient's forearm while underground. The patient starts complaining that they cannot feel their fingers after arriving on the surface. What should the rescuer do?

A. Release part of the air in the splint because the air has expanded in the splint due to moving from a cold temperature area to a hot temperature area.

Q. A patient has a suspected fracture of the forearm. The patient is holding the arm in a bent position and is stabilizing the arm against the chest with the other arm. What is the correct treatment?

A. Splint in the position found, if possible. Apply a rigid, wooden Splint. Leave the fingers exposed for follow - up examinations of circulation and feeling. Then apply a sling and swathe

## QUESTIONS FOR REVIEW

### Lower Extremity Injuries

Q. What would be associated with a fracture of the femur (thigh bone)?

A. The leg will be turned outward,
The injured leg will be noticeably shorter than the other leg,
The patient will not be able to move the injured leg and severe pain and swelling will be present.

Q. What is important information as related to an injury of the femur (thigh bone)?

A. Check circulation and sensation, both before and after splinting,
If long leg wooden splints are used to stabilize, place one splint on the outside of the leg and one splint on the inside of the leg,
Treat for shock by keeping the patient warm.

Q. Which of the following is a general rule for splinting knee injuries?

A. Splint as you find it.

Q. Which of the following is not correct as related to splinting a knee injury?

A. A pillow splint can be used,
A long leg air splint can be used,
Rigid wooden board splints can be used.

Q. What will usually cause the most deformity?

A. Dislocations of the knee, hip, shoulder, or elbow.

Q. A patient has an injury in the knee area and you cannot determine if the injury has caused a fracture or dislocation. How should you treat?

A. Splint in the position found.

Q. What is the main concern that a rescuer should have while treating a knee injury?

A. Treat and stabilize to reduce the risk of loss of sensation and circulation below the knee.

Q. What is important information as related to ankle and foot injuries?

A. Such injuries are commonly caused by twisting forces,
You should initially care for such injuries as if they are serious,
A rescuer usually cannot distinguish between minor or severe Injuries.

Q. What is important information as related to splinting an ankle or foot injury?

A. An air splint can be used,
A rolled blanket splint can be used,
Elevate the injured ankle after splinting to help reduce swelling and apply a cold pack.

Q. A person became off balance and fell seven (7) feet off a ladder and landed on both feet. The patient is complaining of pain in both ankles and back. What should a rescuer treat for in addition to ankle injuries?

A. Suspect a spine injury and stabilize on a backboard.

# HEAT AND COLD EMERGENCIES

## Body temperature

The body temperature must remain constant for the body to work efficiently.

Normal body temperature is 98.6 degrees Fahrenheit.

Body heat is generated primarily through the conversion of food to energy.

Body heat is also produced by muscle contractions such as exercise, shaking and shivering.

Heat always moves from warm areas to cooler areas.

The body removes heat from the body through the skin. Blood vessels near the skin dilate (get larger) to bring more blood near the surface. Heat escapes through the skin and through sweating.

The body reacts to a cold environment by constricting (get smaller) blood vessels near the skin to avoid losing body heat.

Air temperature, humidity and wind are three external factors that affect how the body maintains its temperature.

The clothing you wear also affects how well the body manages extreme temperatures, both hot and cold.

## Cold emergencies

Cold emergencies are divided into 2 types:

1) Frostbite
2) Hypothermia

Frostbite occurs when the body is exposed to cold.

Hypothermia occurs when the body can no longer generate sufficient heat to maintain normal body temperature.

### Frostbite

Frostbite is the freezing of body tissues.
Frostbite can affect the skin or deep tissues

Frostbite can cause loss of fingers, hands, arms, toes, feet and legs.

Signs and symptoms of frostbite:

1) Lack of feeling in the affected area.
2) Skin that appears waxy.
3) Skin that is cold to the touch.
4) Skin that is discolored (flushed, white, yellow or blue)

Treatment for frostbite:

1) Check and treat RBB's
2) Handle the area gently and cover the affected area to re-warm if you don't have warm water immediately available to re-warm the body part
3) If available, place the frostbitten part in warm water that is 100 to 105 degrees Fahrenheit.
4) Keep the frostbitten body part in the warm water until it appears red (normal) and feels warm.
5) After re-warming, bandage the area with a dry, sterile dressing.
6) Avoid breaking any blisters
7) Recheck and monitor RBB's
8) Transport to the hospital safely

## Hypothermia

Hypothermia occurs when the entire body cools after the warming mechanisms have failed.

In hypothermia, the body temperature drops below 95 degrees Fahrenheit.

Signs and symptoms of hypothermia:

1) Shivering
2) Slow, irregular pulse
3) Numbness
4) Glassy stare
5) Apathy and decreasing levels of consciousness

Treatment for hypothermia:

1) Check and treat the RBB's. Treat life threatening problems immediately.
2) Notify and make arrangements to transport to a medical facility (hospital) as quickly and safely as possible.
3) Remove any wet or damp clothing.
4) Dry the patient, if wet.
5) Wrap the patient in blankets, put on dry clothing, etc.
6) Move the patient to a warm area.
7) If available, hot water bottles, heating pads, etc. can be applied to help re-warming the body
8) Give patient warm liquids to drink if conscious and fully alert.
9) Never re-warm the patient too quickly because too rapid re-warming can cause dangerous heart rhythms.
10) Handle the patient very gently.
11) Recheck and monitor RBB's
12) Transport the patient to the hospital as quickly and safely as possible.

# HEAT EMERGENCIES

Illnesses caused by exposure to extreme temperatures are progressive and can become life-threatening.

Immediate treatment can prevent the illness from becoming life-threatening.

The body releases heat through the skin and by sweating.
Blood vessels near the skin dilate (get larger) and help bring excessive heat to the surface of the skin.

High risk people for heat related illness:

1) Those who work strenuously outdoors
2) Elderly people
3) Those with health problems
4) Those who have had a heat-related illness in the past
5) Those who have a respiratory or cardiovascular disease (heart problem) or other conditions that cause poor circulation (diabetes)
6) Those who take medications to eliminate water from the body

Heat related emergencies:

1) Heat cramps
2) Heat exhaustion
3) Heat stroke

Heat cramps

Heat cramps are painful spasms of muscles.

Believed to be caused by a combination of fluid and salt loss caused by heavy sweating.

Heat cramps develop rapidly and usually occur after heavy exercise or work outdoors in warm temperatures.

Heat cramps usually affect the leg or abdomen muscles.

Treatment for heat cramps:

1) Have the patient move to a cool place and rest comfortably.
2) Provide cool water or a commercial sports drink (Gatorade) Usually rest and fluids are all that the body needs..
3) The patient should not resume any activity until the cramps stop.
4) Inform the patient to drink plenty of fluids during physical activities.

Heat exhaustion:

Heat exhaustion is the most common form of heat-related illness.

Heat exhaustion occurs after long periods of strenuous exercise or work in a hot environment.

Heat exhaustion is an early sign that the body's temperature - regulating mechanism is becoming overwhelmed. The patient loses fluid through sweating which decreases the blood volume. Blood flow to the skin increases, which reduces blood flow to the vital organs. The patient goes into mild shock because the circulatory system is affected.

Signs and symptoms of heat exhaustion:

1) Normal or below-normal body temperature
2) Cool, moist, pale skin
3) Headache
4) Nausea and/or vomiting
5) Dizziness and weakness
6) Exhaustion
7) Possible change in the level of consciousness
8) Increasing level of body temperature, if not treated promptly

Treatment for heat exhaustion:

1) Have the patient move to a cool place and provide comfortable patient rest.
2) Provide cool water to drink, as long as the patient is conscious and fully alert.

Heat stroke:

Heat stroke is the most serious heat-related illness but is the least common.

Heat stroke usually occurs when patients ignore the signs and symptoms of heat exhaustion.

Heat stroke develops when the body heat regulating mechanism begins to stop functioning.

Heat stroke causes the body to stop sweating because the body fluids have become low.

When sweating stops, the body cannot cool itself effectively and the body temperature rises rapidly.

The body temperature will rise to such a high level that the brain, heart and kidneys will begin to fail.

If the body is not cooled, convulsions, coma and death will result.

Signs of heat stroke:

1) High body temperature (may go as high as 106 degrees
2) Red, hot, dry skin
3) Rapid, weak or irregular pulse
4) Rapid, shallow breathing
5) Progressive loss of consciousness

Treatment of heat stroke:

1) Move the patient to a cool place and provide comfortable patient rest.

2) Evaluate and treat RBB's

3) Remove any tight or heavy clothing

4) Cool the body by applying cool, wet cloths, towels, sheets, etc. to the skin (If ice packs are available, place on the neck, armpits, ankles, wrists, etc. to cool large blood vessels.)

5) Have the patient drink cool water slowly, if conscious and fully alert. Don't let the patient drink too quickly. Give the patient about one-half glass of water every 15 minutes. If the patient vomits, stop giving water and place the patient on their side such that vomitus will drain away from their throat to help prevent a possible airway obstruction and/or aspiration of vomitus into the lungs.

6) Monitor the patient closely and watch for changes in their condition.

7) Keep the patient lying down and continue to cool the body.

8) Recheck and treat RBB's

Always be prepared to perform rescue breathing and/or CPR because this is a very serious condition that could affect breathing or the heart at any time.

## QUESTIONS FOR REVIEW

## Heat and Cold Emergencies

Q. What are important facts as related to body temperature heat?

A. Heat is generated primarily through the conversion of food to Energy,
Heat is also produced by muscle contractions such as exercise, shivering, etc.,
Heat always moves from warm areas to cooler areas,
The body maintains its temperature by constantly balancing heat loss.

Q. What are important facts related to body temperature heat and cold?

A. When body heat increases, the body removes heat through the skin,
Blood vessels near the skin dilate (get larger) to bring more blood and heat near the surface where it escapes from the body,
The body reacts to cold by constricting (narrow) blood vessels near the skin to conserve body heat,
When exposed to cold and constriction of blood vessels fail to keep the body warm, shivering results.

Q. Who would be classified as a person at risk for a heat or cold related illness?

A. Those who work or exercise strenuously outdoors or in unheated or poorly cooled areas,
Elderly people,
Those with health problems such as heart problems, diabetes, etc.,
Those who have a respiratory or cardiovascular disease or other poor circulation illness.

Q. What is the correct treatment for heat cramps?

A. Have the patient rest comfortably in a cool place,
Provide cool water or commercial sports drink (Gatorade, etc.) to drink (about 1 half glass every 15 minutes,
Gently massage the cramp area.

Q. Which of the following is the most common heat related illness?

A. Heat exhaustion.

Q. What are signs or symptoms of heat exhaustion?

A. Cool, moist pale skin,
Headache,
Nausea and vomiting,
Dizziness.

Q. What are important facts as related to the treatment of heat exhaustion?

A. Can usually be reversed with prompt care,
Have the patient rest comfortably in a cool place,
Give the patient cool water to drink when conscious and alert.

Q. What is the least common but most serious heat related illness?

A. Heat stroke.

Q. What are important facts as related to heat stroke?

A. Occurs often when a patient ignores the signs and symptoms of heat exhaustion,
Develops when body systems are overcome by the effects of heat and begin to stop functioning,
Sweating stops because body fluids are low,
The body temperature rises rapidly.

Q. What are signs of heat stroke?

A. Red, hot, dry skin,
High body temperature,
Progressive loss of consciousness,
Rapid, weak pulse and rapid, shallow breathing.

Q. What is important information as related to the treatment of a heat related illness?

A. Never apply rubbing alcohol to the skin,
Have the patient drink cool water or Gatorade slowly (one half glass every 15 minutes), if conscious and alert,
Have the patient rest comfortably in a cool place and not to resume normal activities that day.

Q. A patient is showing signs and symptoms of a heat-related illness. What may be signs that the patient's condition is getting worse?

A. The patient refuses to drink water,
The patient starts vomiting,
The patient's level of consciousness starts changing for the worse.

Q. A patient is suffering from a heat related illness. The rescuer is giving the patient water to drink and the patient starts vomiting. What should the rescuer do?

A. Stop giving water, position the patient on one side, treat and stabilize airway and breathing.

Q. What are important facts as related to frostbite and cold emergencies?

A. Frostbite is the freezing of body tissues,
Frostbite usually occurs in exposed areas of the body,
Frostbite causes water in and between body cells to freeze and swell.

Q. What does the seriousness of frostbite, and the cold emergencies depend on?

A. Air temperature,
Length of exposure,
The wind.

Q. What should be the temperature of water that frostbitten areas are re-warmed with?

A. 98.6 to 104 degrees Fahrenheit.

Q. What are important facts as related to treating frostbite areas?

A. Handle the affected area very gently,
Cover the affected area before and after re-warming in water,
Never rub the affected area.

Q. How long should a frostbitten area remain in water used to re-warm?

A. Until the area appears red and feels warm.

Q. What are signs or symptoms of hypothermia?

A. Decreasing level of consciousness,
Numbness,
Slow, irregular pulse,
Glassy stare.

Q. What are important facts as related to the treatment of hypothermia?

A. Conduct an initial assessment and treat life-threatening problems,
Call for advanced medical help (rescue squad, etc),
Remove wet clothing, keep the patient dry and cover the body

Q. What are signs or symptoms of frostbite?

A. Lack of feeling in the affected area,
Skin that is cold to the touch,
Skin that is discolored (flushed, white, yellow, blue)

## SUDDEN ILLNESS-DIABETES, EPILEPSY, STROKE, ANAPHYLAXIS

Sudden illnesses have a variety of signs and symptoms.
A patient's level of consciousness may change.
A patient may complain of feeling lightheaded, dizzy, weak, nauseated and/or vomit.
Breathing, pulse and skin characteristics may change.

Sudden illnesses such as fainting, diabetes, epilepsy, stroke and shock can cause a change in consciousness.

Fainting

Fainting is the most common sudden illness.

Fainting is a partial or complete loss of consciousness.

Fainting is caused by a temporary reduction of blood flow to the brain as blood pools in the legs and lower body.

Fainting can be triggered by an emotional shock such as the sight of blood, pain, medical conditions, standing for a long time, overexertion, etc.

Signs and symptoms of fainting:

1) Lightheaded or dizzy feeling
2) Signs of shock, including pale, cool, moist skin
3) Nausea feeling
4) Numbness and tingling of the fingers or toes
5) Increase in breathing and/or pulse rate

Treatment for fainting:

Fainting usually resolves itself.

When a patient is moved from an upright position to a horizontal position (lying down), normal circulation is restored to the brain.

The patient usually regains consciousness within a couple of minutes.

Be cautious and treat for a possible spine injury if the patient fell while fainting

Treatment:

1) Evaluate and treat RBB's
2) Lower the patient to the ground or a flat surface
3) Elevate the patient's feet if no injuries are present
4) Loosen any tight clothing
5) Recheck the RBB's

Do not give the patient anything to eat or drink
Do not splash water on the patient's face

Diabetic emergencies:

Body cells need sugar as a source of energy. The body breaks down food into sugar. Sugars cannot pass freely into the body cells. Insulin is necessary to help sugars pass into the body cells.Insulin is produced by the pancreas.

A condition in which the body does not produce enough insulin is called sugar diabetes. A person who has this condition is called a diabetic.

Any person who is a diabetic must carefully monitor their diet and exercise.

When a diabetic fails to control these factors, either imbalance can become a diabetic emergency.

Hyperglycemia (Hyper-High Sugar Level)

The sugar level in the blood is high
The insulin level in the blood is low
Sugar is present in the blood but cannot be transported into cells due to low insulin
Hyperglycemia is slow coming on and slow to reverse

Hypoglycemia (Hypo-low Sugar Level)

The insulin level in the blood is too high
The sugar level in the blood is low
The onset is quick and rapid
Shallow breathing
Confusion or unresponsiveness

The patient must receive advanced medical care when the following conditions are present:

1) If the patient becomes unresponsive
2) Is having seizures, faints, or goes into coma
3) Is unable to follow simple commands
4) Cannot swallow safely
5) Has rapid changes in their mental status

Treatment for diabetic emergencies:

Evaluate and treat RBB's

If responsive, ask the patient if they are diabetic
If unresponsive, look for a medic-alert tag on the neck, wrists and ankles

If responsive and talking, give sugar in some form, such as candy, fruit juices, non-diet soft drinks. Common table sugar, either dry or dissolved in a glass of water can be given.

If unresponsive, call EMS or have someone to do it

Maintain normal body temperature (keep the patient warm)

Recheck and treat RBB's

If the patient does not feel better within 10 to 15 minutes, then give another dose of sugar in some form and prepare to transport to a medical facility.

Epilepsy

An acute or chronic condition that may cause seizures.

A seizure is a loss of body control caused by an electrical irregularity of the brain.

The electrical activity of the brain becomes irregular when normal functions of the brain are disrupted by injury, disease, fever, infection or epilepsy.

Signs and symptoms of a seizure:

Patient may have an unusual sensation or feeling such as a visual hallucination, a strange sound, taste, smell or urgent need to get to safety
Uncontrolled muscular contractions (convulsions)
Irregular or possibly stoppage of breathing

Treatment for a seizure:

1) Check and manage the airway
2) Protect the patient from injury, never try to stop a seizure or restrain a patient who is having a seizure
3) Position the patient on one side for drainage, if saliva or vomitus is present in the mouth
4) Never place anything in the patient's mouth, including your fingers
5) Perform a survey after the seizure has run its course
   Treat any injuries that may have occurred during the Seizure**.** Offer comfort and reassure the patient
   Ask bystanders not to crowd around the patient

6) Stay with the patient until they are fully conscious and aware of their surroundings. Seizure patients usually recover in a few minutes.

Transport a seizure patient to the hospital if :

1) If the seizure lasts more than a few minutes
2) If the patient has repeated seizures
3) If the patient appears to be injured
4) If you are uncertain about the cause of the seizure
5) If the patient is a known diabetic
6) If the seizure takes place in water
7) If the patient fails to regain consciousness after the seizure

Stroke

A stroke is caused by a disruption of blood to the brain, serious enough to damage brain tissue. A stroke is caused by one of the following:

A clot that forms in the brain and restricts or stops blood flow
A clot that forms elsewhere in the body, travels to the brain and restricts or stops blood flow
A blood vessel that bursts in the brain

Signs and symptoms of a stroke

1) A patient looking or feeling ill
2) Changes in consciousness or abnormal behavior
3) Weakness and numbness of the face, arm, or legs usually on one side of the body
4) Difficulty in talking or understanding verbal communications
5) Blurred or dimmed vision
6) Unequal pupils
7) Sudden, severe headache
8) Dizziness, confusion, changes in behavior/mood
9) Ringing in ears
10) Loss of bladder or bowel control

Treatment for a stroke

1) Check and treat RBB's
2) Position the patient on one side if fluid or vomitus is present in the mouth. A finger sweep may be necessary to remove material from the mouth
3) Secure to a backboard and transport quickly and safely to the hospital
4) If patient is responsive, comfort and reassure them
5) Never give anything to eat or drink
6) Monitor and treat responsiveness while transporting

Recognizing Stroke using the FAST method:

**F-Face** Face drooping or drooling from the mouth

**A-Arm** Arm weakness. Is one arm weaker than the other

**S-Speech** Is their speech slurred. One side of the face drawn. Difficulty speaking

**T-Time** Time to contact EMS and transport immediately

## Anaphylactic Shock

Severe allergic reactions are rare but are life-threatening if they occur.

Anaphylaxis is a form of shock.

Anaphylaxis (severe allergic reaction) can be caused by an insect bite, sting or by contact with drugs (penicillin), medications, food, chemicals, etc.

### Signs and symptoms of Anaphylaxis

1) Usually occurs suddenly
2) Skin or area of the body affected usually turns red and swells
3) Hives, rash and itching
4) Weakness
5) Nausea and vomiting
6) Dizziness
7) Breathing difficulty, including coughing and wheezing
8) Breathing may progress to respiratory distress

### Treatment for Anaphylaxis

1) Make sure EMS is notified immediately
2) Check and treat the RBB's
3) If available give oxygen
4) Assist the patient to make as comfortable as possible.
5) Keep the patient as calm as possible.
6) Monitor responsiveness and breathing closely

If a patient is known to have severe allergic reactions and carries an anaphylaxis kit, you can assist the patient with the injection of epinephrine.

## Poisoning

A poison is any substance that causes injury or illness when introduced into the body. Poisons include solids, liquids, fumes, gases and vapors.

Poisons can enter the body in 4 ways:

1) Ingestion
2) Inhalation
3) Absorption
4) Injection

Ingestion - Swallowing a poison (alcohol, medications, spoiled food, drinking unidentified liquids, etc.)

Inhalation- A patient inhales toxic fumes (Gases such as carbon monoxide, carbon dioxide, glues, paints, etc.)

Absorption - A poison enters the body after coming in contact with the skin (poison ivy, poison oak, fertilizers, pesticides, drugs, etc.)

Injection - Poisons that enter the body through bites or stings of insects, spiders, ticks, animals, snakes, drugs, etc.

The most important thing to remember about a possible poison situation is to recognize that a poisoning may have occurred and regard all poison situations as serious.

Contact the Poison Control Center and seek medical help (hospital) immediately, even if you have a slight suspicion that the patient has been poisoned.

Be cautious of odors, flames, smoke, or other signs of possible Poisoning

Signs and symptoms of poisoning:

1) Burn injuries around the mouth and nose
2) Nausea and vomiting
3) Diarrhea
4) Chest or abdominal pain
5) Breathing difficulty
6) Sweating
7) Altered level of consciousness
8) Seizures

Try to get the following information if you suspect a poisoning:

1) What was taken
2) How much was taken
3) When it was taken

POISON CONTROL CENTERS—1-800-222-1222

The severity of a poisoning depends on the type and amount of the substance, how it entered the body and the patient's size, weight and age.

Some poisons act fast, some act slow and sometimes you may not be able to identify the poison.

Call a Poison Control Center (PCC) immediately if you have a conscious patient suspected of poisoning. The PCC will tell you what treatment to give and whether the patient should be transported to the hospital.

When calling the Poison Control Center provide the name of the poison product, means of ingesting the poison, and time of exposure

Transport immediately to the hospital, if a suspected poisoned patient is unconscious.

General treatment for poisoning

Notify EMS and the Poison Control Center immediately
Survey the scene to make sure it is safe to enter to get clues about what happened.
Remove the patient from the source of the poison
Perform a primary survey to assess the patient's responsiveness, breathing and any life-threatening bleeding
Treat all life-threatening conditions
Prepare for transportation to the hospital.

Never give the patient anything by mouth unless advised by the PCC or other medical professionals. If the poison is unknown and the patient vomits, save some of the vomitus which can be used to identify the poison.

Treatment for ingested poison

Notify EMS and the Poison Control Center immediately
Check responsiveness and evaluate breathing
Do not give anything by mouth unless directed to do so by PCC.
Always follow the directions and treatment authorized by PCC.
Monitor responsiveness and breathing

Inhaled poisoning

Toxic fumes come from a variety of sources. Toxic fumes may or may not have an odor. Gases like carbon dioxide and carbon monoxide do <u>not</u> have an odor.

A pale or bluish skin color indicates a lack of oxygen and may alert you to carbon monoxide poisoning. The skin may later turn red, usually after death in cases of carbon monoxide poisoning.

Treatment for inhaled poisons

Notify EMS and the Poison Control Center immediately
Survey the scene to make sure it is safe to enter.
If possible and safe to do, remove the patient from the poison as soon as possible.
Check Responsiveness and breathing
Give oxygen if available
Stabilize and secure the patient to a backboard, if necessary.
Continue to monitor responsiveness and breathing
Transport to a medical facility (hospital).

Treatment for absorbed poisons

Notify EMS and the Poison Control Center immediately
Flush the affected area with large amounts of water, including dry or wet chemicals that contact the skin.
Check responsiveness and evaluate breathing
Continue to flush while transporting and while waiting for advanced medical personnel.
Continue to monitor responsiveness and evaluate breathing
Transport to a medical facility

Treatment for injected poisoning

The most common sources of injected poisons are caused by insect stings and animal bites.

Treatment for insect stings

Check responsiveness and evaluate breathing
Examine sting area to see if the stinger and venom sac are still present. Remove stinger by scraping from the skin with a fingernail, plastic card, etc.
Wash the sting area with water
Apply cold applications such as ice to reduce swelling
Continue to monitor responsiveness and evaluate breathing
Transport to a medical facility

## Spider Bites

Two types of spiders (black widow, brown recluse) have venom whose bites are serious and can be fatal. Both spiders prefer dark, out of the way places such as wood, rock or brush piles and in dark storage areas. A patient may not know they have been stung until signs/symptoms develop. A patient stung by either type should be transported to the hospital immediately.

### Signs and symptoms of spider bites:

Nausea and vomiting
Difficulty breathing or swallowing
Sweating and profuse saliva in the mouth
Irregular heart rhythms that may lead to cardiac arrest
Severe pain in the sting area
Swelling on or around the site
A mark indicating a bite or sting area

### Treatment for spider bites

1) Check responsiveness and evaluate breathing
2) Give oxygen if available
3) Plan for immediate transportation to the hospital

## Snakebites

Much controversy has been discussed on how to treat snakebites. Approximately 8000 people are snake bitten each year and less than 12 die. Most deaths from a snakebite occur because the patient has an allergic reaction, weak body system or a long-time delay before reaching the hospital.
Most snake bitten patients can get to a hospital within 30 minutes.

Do not apply suction to snakebites anymore. You can apply a constricting bandage around an arm or leg to slow the spread of venom

Treatment of snakebites

Check responsiveness and evaluate breathing
If the bite is on an extremity, you can apply a constricting bandage to help slow the spread of venom
Keep the affected part lower than the heart, if possible
Transport to the hospital immediately

Animal Bites

The bite of an animal carries a risk of infection, the most serious of which is rabies. Rabies is transmitted through the saliva of diseased animals such as dogs, cats, skunks, raccoons, bats, foxes, etc. Rabid animals may salivate (foam at the mouth), appear partially paralyzed, act aggressive, irritable or act abnormal. If not treated, rabies is fatal. A patient bitten by a rabid animal must receive medical attention.

Treatment for animal bites

Try to get the patient away from the animal without endangering yourself. Get a description of the animal and where it was last seen. Never try to capture the animal

Check responsiveness and evaluate bleeding

Wash the wounds with water and then control bleeding, if the wound is minor.

Transport to the hospital.

## Ticks

Ticks can carry and transmit Rocky Mountain spotted fever and Lyme disease. The first sign of infection from a tick bite may appear a few days or a few weeks after the bite. A rash starts as a small red area and may spread 5 to 7 inches.

Signs and symptoms of a tick bite:

- Rash, as described above
- Fever
- Headache
- Weakness
- Flu like pains in the joints and muscles

Advanced stages of tick bite if not treated:

- Arthritis
- Numbness
- Memory loss
- Problems in seeing or hearing
- High fever
- Stiff neck
- Irregular or rapid heartbeat

Removing a tick:

- Remove by pulling steadily and firmly
- Grasp the tick with fine-tipped tweezers, as close to the skin as possible and pull slowly. If you don't have tweezers, you can use fingers but wear gloves to protect yourself.
- Never try to burn a tick off with a hot match or burning cigarette.
- Do not use other home remedies like coating with nail polish
- Wash the bite area.
- Apply antibiotic ointment, if available
- Inform the patient to observe the bite area and see a doctor if a rash or flu-like symptoms develop.

## QUESTIONS FOR REVIEW

### Sudden Illness Diabetes, Epilepsy, Stroke, Poisoning

Q. Which of the following hormones must be present in order for the body to use sugar?

A. Insulin.

Q. What is important information as related to diabetic emergencies?

A. When the insulin in the body is too low, the sugar level in the blood is high,
When the insulin in the body is too high, the sugar level is low,
Sugar given in various forms can restore a diabetic patient's condition to normal.

Q. What illness results when too much or too little sugar is present in the body?

A. Diabetic emergency.

Q. A known diabetic patient becomes dizzy and feels ill. How should a rescuer treat?

A. If conscious and alert, give sugar in some form (candy, fruit juice, non-diet soft drinks, etc.).

Q. What are important facts as related to diabetic emergencies?

A. Never give anything by mouth unless the patient is fully Conscious and alert,
Sugar given to a patient that has low blood sugar will help the patient quickly,
Sugar given to a patient that has high blood sugar will not cause any more significant problems.

Q. What may cause seizures?

A. Disease or high fever, injuries, and infections.

Q. What are important facts about seizures?

A. A seizure is a loss of body control due to irregular electrical activity of the brain, A rescuer's main objectives in treating a patient having seizures are to manage the airway and protect the patient from injury,
Never try to place anything between the patient's teeth.

Q. Which seizure patients should see a doctor:

A. The patient has repeated seizures,
The patient is a known diabetic,
The seizure lasts longer than a few minutes,
The patient fails to regain consciousness after the seizure,
You are uncertain about the cause of the seizure,
The patient appears to be injured.

Q. What are major causes of a stroke?

A. A blood clot forms on the brain and blocks the supply of blood to a particular part of the brain,
A blood clot forms elsewhere in the body, travels to the brain and blocks a blood vessel in the brain,
A blood vessel in the brain ruptures,
A tumor or swelling from a head injury may compress an artery and cause a stroke.

Q. What are signs or symptoms of a stroke?

A. Looking or feeling ill,
Changes in consciousness or behavior,
Weakness and numbness of the face, arm or leg that usually occurs only on one side of the body,
Difficulty in talking or understanding speech,
Blurred or dimmed vision with possible unequal pupil size,
Sudden severe headache or dizziness,
Confusion or sudden change in mood

Q. What is the main concern that a rescuer should have in treating a patient suspected of having a stroke?

A. Evaluate responsiveness and monitor breathing, treat any life-threatening conditions, and ensure patient has an open airway

Q. Which of the following may occur during a seizure that a rescuer can expect and have very serious concerns about?

A. Breathing may become irregular and even stop temporarily.
Muscle contractions
Drowsiness and tiredness

Q. What is correct as related to mini-strokes?

A. Signs and symptoms usually disappear within a few minutes or hours,
Mini-strokes are caused by reduced blood flow to part of the brain,
Mini-strokes are a temporary episode that is like a stroke.

Q. What is used to help rescuers to recognize signs and symptoms of stroke?

A. The FAST method. F is for FACE, A is for ARM, S is for SPEECH and T is for TRANSPORT

Q. A patient with a know severe allergic reaction gets stung by a honey bee. He very quickly starts having breathing difficulties. He always has an EpiPen in his bucket. What would be the treatment for this patient?

A. Check responsiveness and evaluate breathing. If the patient is responsive, you can assist them with administering the EpiPen. If their condition does not improve after 5 minutes, then you can assist with a second dose. Notify EMS and Transport

Q. How do poisons usually enter the body?

A. Ingestion (through the mouth and swallow),
Inhalation (through the mouth and/or nose),
Absorption (through the skin),
Injection (stings and bites injected through the skin).

Q. What is the most important thing to remember about the signs and symptoms of a suspected poisoning?

A. Recognize that a poisoning may have occurred.

Q. What are common signs or symptoms of poisoning?

A. Nausea, vomiting and diarrhea,
Chest or abdominal pain,
Sweating and difficult breathing,
Altered level of consciousness and/or seizures.

Q. What is important information that a rescuer should try to get in suspected poison incident to report to the Poison Control Center?

A. What type of poison was taken,
How much poison was taken,
When the poison was taken.

Q. What are the factors in determining the severity of a poisoning incident?

A. Type and amount of poison,
How the poison entered the body,
The patient's age and weight.

Q. What is the first thing that a rescuer should do at the scene of a suspected poisoning incident?

A. Survey the scene to make sure it is safe to approach the patient.

Q. After notifying PCC and EMS and securing the scene at a poisoning incident, what should a rescuer do next?

A. Remove patient from the source of the poison as soon as possible and if safe to do so.
Conduct an initial assessment. Evaluate Responsiveness, Breathing, and Breathing

Q. What are the first rescue actions as related to a suspected poisoning incident?

A. Contact the Poison Control Center and EMS immediately. Always survey the scene to make sure it is safe to approach the patient

Q. What is important information as related to the authority of a rescuer to give a patient anything by mouth and/ or induce vomiting?

A. Never give anything by mount and never induce vomiting unless authorized and directed by the Poison Control Center or EMS personnel.

Q. What is the treatment for insect stings such as a honeybee, yellow jacket, etc.?

A. Scrape the stinger away from the skin with your fingernail, plastic card, etc.,
Apply ice or a cold pack to the sting area to reduce pain and Swelling,
Examine the sting area to see if the stinger and venom sac are attached to the skin.

Q. A rescuer arrives at the scene of a possible inhalation poisoning incident. After surveying the scene to ensure the accident area is safe to enter, what should you do next?

A. Remove the patient from the poison area as soon as possible and safe to do.

Q. What is the treatment for a patient that has a dry or wet chemical spilled on the skin?

A. Flush the affected area with large amounts of water until rescue personnel arrive.

Q. What is the correct treatment for a snakebite on an arm or leg?

A. Never perform any type of suction on a snakebite wound. Apply a pressure/constricting bandage above the bite location (between the heart and bite area) to help prevent the venom from spreading. Check the bandage after applying to insure it is not too tight.

Q. What are important facts as related to a patient that was bitten by an animal?

A. Try to get the patient away from the animal without endangering yourself,
Try to get a good description of the animal and the area where it was seen last,
Never try to restrain or capture the animal.

Q. What are signs or symptoms of “Lyme’s Disease” that is associated with a tick bite?

A. Joint and muscle pain, similar to the flu,
Fever and headache,
Weakness,
A rash at the bite area.

Q. What may cause a severe allergic reaction (anaphylaxis)?

A. Insect bite or sting,
Medications and chemicals,
Food.

Q. What is the most important factor that a rescuer should consider when managing an allergic reaction incident?

A. Breathing difficulty may result and progress to an obstructed airway as the tongue and throat (airway) swell.

Q. A patient is having a suspected severe allergic reaction. What may cause severe breathing problems, airway obstruction, or even death?

A. The tongue and airway swells; breathing is severely impaired as the airway becomes obstructed.

Q. What should a rescuer do when the poison control center gives you directions concerning a poisoning incident?

A. Do exactly what the directions are.

Q. What is correct as related to the treatment for poisoning?

A. Survey the scene, make sure it is safe to enter,
Conduct an initial assessment. Check Responsiveness, Breathing, and Bleeding.
Contact the Poison Control Center and/or call for advanced medical help (rescue squad),
Never give anything by mouth unless directed to do so by the Poison Control Center or EMS personnel

## Patient Assessment

Survey the Scene

Take adequate time to evaluate the scene to ensure the area is safe to enter for yourself and people assisting you. Always assure the scene is safe before you or others enter the area.

Mechanism of Injury or Nature of Illness

You need to be able to answer the following questions:

What has happened?

Is the patient involved in a roof/rib fall?

Is the patient involved in a machinery accident?

Is the patient experiencing an sudden illness such as a heat attack, allergic reaction, stroke, diabetic emergency etc.

Do any special safety precautions need to be taken to safely gain access to the patient?

Number of Patients and Priorities of Care

You will need to answer the following questions:

How may patients do you have?

Most of the time an injury is only one individual but in the industry we work in, we could arrive at a scene where multiple individuals have injuries that need to be treated.

Who do you treat first?

Triage is an important tool to use when dealing with multiple people who have been injured. You have to assess everyone's state of Responsiveness, Breathing, and Bleeding. You first priorities would be anyone who is Unresponsive.

Resources and coworkers available to treat multiple patients

If you are working with multiple patients, you need all the help you can get.

Most coworkers and bystanders are willing to assist you if they know what to do. That means that you have to assume the role of team leader and direct everyone on what you need to do. Always be very clear with your instructions.

Always consider what resources you need and their location. Direct those assisting you with very detailed instructions on what you need and where to go to get them.

Multiple patient accidents will present a variety of factors that most people do not consider. First Aid trained personnel, and Mine Officials are expected to step up and take charge of the situation. This includes coordinating activities, providing instructions, stabilizing the patient and transporting to the surface, and making arrangements to get patient transported to a medical facility.

Performing an Initial Assessment

Your first assessment is to evaluate the RBB's
Responsiveness, Breathing, and Bleeding

State of Responsiveness:

A patient is responsive if they can speak, blink, move, and react. An unresponsive patient cannot speak, blink, move, and react.

Levels of Responsiveness:

We have already discussed that during the initial assessment, it is vital to determine the state of responsiveness of a patient. This can be achieved by using AVPU method to determine the state of a patient's responsiveness.

**A--Alert:** Is the patient alert, oriented, and aware of what is going on around them?

**V-Verbal:** Does the patient respond when you speak to them?

**P-Painful:** Does the patient respond when you pinch the skin at the earlobe or under the lower eyelid?

**U-Unresponsive:** The patient does not respond to any other stimuli. To verify the patient is unresponsive look for a rise and fall of the chest while listening for sounds of breathing for 5 to 10 seconds.

Bleeding and Status of Circulation

Does the patient show any signs of bleeding? If so, does the bleeding appear to be minor, severe, or life-threatening? Do you suspect internal bleeding based on the scene and mechanism of injury?

Bleeding Controls

The first choice in controlling bleeding is direct pressure. This is accomplished by placing a sterile gauze dressing over the wound and covering with a bandage or constricting bandage.

If direct pressure is not effective or when you arrive at the scene you observe a substantial amount of blood loss then, you will apply a tourniquet to help control the bleeding. Record the time that it was applied. Never loosen a tourniquet once it is applied.

Another option to use to control bleeding is a hemostatic dressing in conjunction with direct pressure. This dressing is coated with a clotting agent which will assist with the blood clotting faster at the wound site.

## Skin Appearance and Temperature

If the skin is pale or white it indicates a lack of circulation and a good sign the patient is in shock. Bluish skin will indicate lack of oxygen in the blood, (Cyanosis).

You can check circulation in a patient by testing their capillary refill. You achieve this by squeezing the fingernail for two seconds. Normal color should return by the time you say capillary refill.

While conducting your primary survey you will observe the condition of the skin. Normal skin is warm and dry. Flushed red or pale skin indicate abnormal skin. Cold and moist skin indicates the patient is in shock.

## Physical Exam from Head to Toe

A complete head to toe survey is designed to obtain information about a patient's condition and the extent of their injuries.

A full survey may not be warranted if you find the patient unresponsive and you have to start CPR or even a responsive person who may direct you to their specific injuries or illness.

If the person is responsive and able to talk tell them what you are going to do and ask permission to treat them. Explain each step you do before you do it. You want to check the head, shoulders, chest, abdomen, arms and legs. Check one body part at a time.
Look for swelling, bleeding, bruising, cuts, and abnormalities. In addition, you will also need to look for a medical ID tag. If the patient is responsive than you need to obtain information concerning their medical status. You can use the SAMPLE method to obtain the information.

S—Signs and Symptoms
A—Any known allergies
M—Any medical conditions the patient may have
P---Any prescriptions the patient may be taking
L---Last food or drink
E---Events leading up to the accident

Keep in mind that at present the patient is responsive. They may not be when the ambulance arrives. The sample questions then become very important.

# HEAD TO TOE SURVEY

Examine the entire body, starting at the head.
If any life-threatening problems develop, stop whatever you are doing and treat immediately.

Check the head.

- Check level of consciousness
- Check for blood or clear fluid in or around the ears, nose and mouth. These indicate a serious head injury.
- Check for bruising around the eyes and behind the ears.
- This indicates a serious head injury.
- Check the pupils.
- Pupils that are unequal, fully dilated or fully constricted or unresponsive to light indicate a serious injury or illness

Check the neck.

- Check for medic-alert necklace.
- Look and feel for any neck abnormality. When head or neck injuries are present or patient has pain of the head, neck or back - manage as if a spinal injury is present.
- Be cautious of all accidents when the mechanism of the accident could have caused a spinal cord injury.

Check the shoulders.

- Check the shoulders and collarbone by feeling for deformity.

Check the chest.

- Feel the ribs for deformity and ask the patient to take a deep breath and exhale.
- Look and feel for equal movement of both sides of the rib cage.
- Look and listen for signs of breathing difficulty.

Check the abdomen.

- Feel and apply slight pressure on each side of the abdomen, high and low (all 4 quadrants of the abdomen).
- A normal abdomen is soft and a rigid abdomen indicates a problem.

Check the hips.

- Examine the hips and ask the patient if they have pain in this area.
- Place you hands on both sides of the pelvis and push down and in. When pushing down and in, ask conscious patients if they feel any pain. If unconscious, observe for nervous system reaction such as flinching, etc.

Check the arms.

- Check one arm at a time.
- Check each wrist for medic-alert bracelet.
- Feel the arms for any deformity.
- Check for adequate circulation and sensation before and after splinting (circulation - capillary refill) (sensation - feeling, movement and flinching, if unconscious)
- Ask the patient to move the fingers and hand on each arm, if conscious.

Check the back.

- Feel the back by reaching under the patient.

Check the legs.

- Check one leg at a time.
- Check each ankle for medic-alert tag.
- Feel the legs for any deformity.
- Check for adequate circulation and sensation before and after splinting (circulation - capillary refill) (sensation - feeling, movement and flinching, if unconscious)
- Ask the patient to move the foot and toes on each leg, if conscious.

## Questions for Review

## Primary-Secondary Survey

Q. What type of conditions are identified and treated during an initial assessment?

A. Life threatening conditions RBB's Level or Responsiveness, Bleeding, and Bleeding.

Q. What would be checked during an initial assessment?

A. Responsiveness, Breathing, and Bleeding

Q. During the initial assessment, what would be evaluated and treated first? The scene is safe for the rescuer an the patient and there are no signs of life-threating bleeding.

A. Check Responsiveness

Q. What is the first course of action that must be done when a rescuer arrives at the accident scene?

A. Ensure the scene is safe for the rescuer, co-workers, and patient to the extent possible.

Q. What may fall backwards against the throat and block the airway if a patient becomes unresponsiveness/ unconscious?

A. Tongue.

Q. How do you open the airway in a patient with no suspected spinal injury?

A. Head-tilt chin lift.

Q. How do you open the airway in a patient with suspected spinal injury?

A. Jaw thrust is the first choice. If you are unable to open or maintain the airway using the jaw thrust method, then use head tilt chin lift.

Q. How does a rescuer ensure that a patient's airway is open?

A. By proper positioning of the head and lower jaw.

Q. How do you evaluate breathing in a patient?

A. Look for the rise and fall of the chest, listen and feel for air exchange at the patient's mouth and nose.

Q. How long should a rescuer take to evaluate breathing?

A. 5 seconds-10 seconds.

Q. What should be present if a patient is breathing?

A. The chest will rise as they inhale and fall as they exhale.

Q. As a rescuer, you may have to triage or sort out patients based on the seriousness of their injuries when you have multiple patients involved. Which one of the following should be treated first?
A person who appears to be unresponsive.
A person who is yelling that they have no feelings in their legs
A person who is shouting for help who is vomiting and sweating
A person who is talking to rescuers about his injuries

A. The person who appears unresponsive should be treated first.

Q. If a rescuer must leave a patient to go get help with no one else present, what should the rescuer do?

A. Place the patient in a recovery position to help keep the airway open.

Q. Which of the following would best describe an unresponsive patient?

A. A patient that cannot speak, move, blink or react to the touch or voice of a rescuer.

Q. Which of the following would best describe a responsive patient?

A. A patient that can move, speak, blink, or react to the touch or voice of a rescuer.

Q. What should a rescuer do if severe bleeding is observed during a primary survey?

A. Treat/control the severe bleeding immediately before proceeding to the secondary survey.

Q. In what position should a rescuer place a talking responsive injured patient?

A. The position most comfortable for the patient.

Q. How do you treat and move a patient when the accident scene and mechanism of injury direct you to suspect that the patient may have a spinal injury?

A. Treat, stabilize, and move as if a spinal injury is present. When in doubt, always treat for possible spinal injury.

Q. The AVPU evaluation is used to determine a patient's state of responsiveness. What do the letters AVPU represent?

A. Alert—The patient responds to you and appears alert
Verbal—The patient reacts when you speak to them
Painful---The patient reacts to painful stimuli
Unresponsive—The patient does not react to any stimuli

Q. What type of stimulus does a patient have if they respond when you talk to them?

A. Verbal stimulus.

Q. What type of stimulus does a patient have if they respond when you pinch the skin?

A. Painful stimulus.

Q. What type of stimulus does a patient have if they are unresponsive?

A. Unresponsive

Q. What are signs or symptoms of abnormal breathing?

A. Painful breathing,
Noisy breathing (crowing or gurgling sound),
Excessively fast or slow breathing,
Gasping for air.

Q. Which organ controls breathing?

A. Brain.

Q. What can be used to evaluate whether blood is circulating properly in the extremities?

A. Capillary refill.

Q. How long should be used to evaluate “capillary refill”?

A. About 2 seconds.

Q. What is the problem if a rescuer does not get a return of blood when checking “capillary refill” in a patient’s injured arm?

A. Insufficient circulation.

Q. During the head-to-toe survey, what should a rescuer look for at the neck, at both ankles and at both wrists?

A. Medical alert tags (necklace, bracelet, etc.).

Q. When doing a head-to-toe survey on a responsive patient with head injuries, what should be checked while observing the head?

A. Presence of blood or clear fluid coming from the ears or head injury,
Presence of blood or clear fluid coming from the nose and/or mouth,
Equal pupils and reaction to light.

Q. What does a rigid abdomen indicate?

A. An injury or problem in the abdomen.

Q. During a head-to-toe survey, how do you check the chest?

A. Feel the ribs for deformity and ask the patient to breath and exhale, if conscious and observe for equal movement of both sides of the rib cage.

Q. During a head-to-toe survey, how do you check the abdomen?

A. Apply slight pressure to each side of the abdomen - high and low (all 4 quadrants) to evaluate if the abdomen is soft (normal).

Q. During a head-to-toe survey, how do you check the hips and pelvis?

A. Push down and in on both sides of the pelvis (ask a conscious patient if this causes pain and observe for a reaction in an unconscious patient).

Q. Why is an unresponsive patient usually in worse condition than a responsive talking patient?

A. In an unresponsive person the brain is no longer in control of body organs and their functions. This includes the brain, heart, and lungs.

Q. Which of the following is correct as related to an ongoing assessment After life-threatening injuries have been evaluated, stabilized, and treated? The patient is responsive and breathing. He responds to verbal stimuli.

A. An ongoing assessment and patient monitoring are required to ensure the patients injuries do not progress to life-threating conditions and the person’s responsive state does not diminish.

Q. You are a certified and designated advanced first aid trained person who provides emergency care if needed on your section. Who can you transfer to for care and transportation to the surface?

A. Another person who is certified in advanced first aid, EMT, or any other individual who has an equal or higher level of first aid training.

Q. You are the certified advanced first aid person on your shift and you transfer care of a seriously ill patient you have been treating over to someone that has no advanced medical training to transport outside. What legal standard could you be held liable for?

A. Abandonment

Q. Which of the following must be considered for patient care when the accident scene and mechanism of injury indicate the patient may have sustained a spinal injury?

A. Clothes drag for emergency move, jaw thrust for opening the airway, and log roll to get the patient on a backboard.

Q. What describes Agonal Gasps?

A. They are initiated in the brain usually a result of low oxygen. They are stray neurological impulses that occur within the first few minutes following cardiac arrest. The patient may make a snore, snort, or groan sound. The patient's mouth may open and the head or neck may move.

Q. How does a rescuer insure that a patient has an open airway while using the head tilt-chin lift or jaw thrust?

A. By proper positioning of the head and lower jaw.

Q. How much time should be taken to look, listen, and feel when evaluating breathing in a patient.

A. About 5-10 seconds

Q. What will be present if a patient is breathing?

A. Chest will rise as patient inhales and the chest will fall as they exhale

Q. What are you checking while looking, listening, and feeling to evaluate a patient's breathing?

A. Presence or absence of breathing

Q. A patient has an open fracture of the leg that has arterial blood spurting from the wound site. A visual examination reveals that a substantial amount of blood has been lost. How would you treat this life-threatening condition?

A. You would apply a tourniquet immediately.

Q. You arrive at an accident scene and observe a patient that appears to be unresponsive, The patient does not speak, move, blink, or otherwise react to your voice. Since the patient does not respond to verbal stimuli, you will continue to check by testing if the patient reacts to painful stimuli. How do you test for painful stimuli?

A. You would test for reaction to painful stimuli by pinching the earlobe or skin at the collarbone. You would observe for a reaction.

Q. You have determined that a patient is unresponsive and not breathing. You are preparing to start CPR. You determine the tongue is blocking the airway and you insert an oropharyngeal airway. You should first test for a gag reflex before inserting the airway. How do you test for a gag reflex?

A. Gently rub the upper eyelid. If the patient's lower eyelid contracts, the patient has a gag reflex and the oral airway should not be inserted

# ROOF-RIB FALL ENTRAPMENT

## PERSONAL SAFETY

Roof and rib fall accidents account for many mining injuries each year. Roof fall entrapments are one of the most serious and most dangerous situations that a rescuer may have to manage.

The first consideration that must be analyzed at the scene of any emergency is the safety of the rescuer and others assisting in rescue efforts. Many rescuers and bystanders have been injured at accident scenes because they failed to evaluate the situation for personal safety hazards. Even though rescuers are oriented in rapid response, a rescuer absolutely cannot overlook adequate safety for yourself and others. Always approach any emergency scene very cautiously. Never rush into a roof fall or any other accident area prior to conducting proper roof evaluations for personal safety hazards. If a rescuer has any doubt about the safety of an emergency scene, he should request assistance from the mine foreman designated by the operator.

## SECURING THE SCENE

Securing the scene is the second course of action that should be taken at the scene of a roof-rib fall entrapment. Making the scene safe helps ensure the safety of the rescuer and to every extent possible, the patient and others at the scene. Temporary roof support may have to be installed to make the accident area safer to enter. A rescuer must always remember that some adverse condition was present for this type of accident to occur. A rescuer may have to solicit the help of other personnel to make the area safe to enter. As soon as possible, a rescuer should evaluate measures that may be required to secure the scene to help prevent further injury to the patient. From second to second, no one knows when more roof or rib material may become adverse that could cause more injuries to the patient or personnel attempting to rescue a patient.

The roof and/or rib fall areas must be secured as soon as possible to help preserve the safety of the patient and everyone working to help the patient. Once again, a rescuer should request guidance and assistance from the designated mine foreman while attempting to secure the scene

## GAINING ACCESS

Gaining access is the third course of action that should be taken at the scene of a roof-rib fall entrapment. The initial evaluation of the scene should include the safest direction from which to approach and attempt to gain access to the patient. A rescuer should always be assisted by the designated mine foreman in determining the safest approach to gain access to an injured person. Access at this type of situation may vary from minor work to major work that may require installing several timers, cribs, safety jacks, etc. to maintain a safe work area while approaching a patient. A rescuer must remember though that roof-rib conditions may deteriorate as you gain access and will require you to take time to re-evaluate the accident area. Additional roof support may have to be installed to maintain the scene as safely as possible for the rescuer and the patient.

The patient's location, types of injuries and severity of injuries should be evaluated while determining the safest direction from which to gain access. A rescuer may have to alter the access plan or direction of access if roof-rib conditions deteriorate that could jeopardize the safety of the rescuer or the patient.

## EXTRICATION

Extrication or removing a patient from an accident scene occurs after a rescuer can safely gain access. Patients should be treated and stabilized at the scene of an accident but situations that may endanger the rescuer or patient will require the patient to be moved. A rescuer may have to move a patient before administering any type of first aid treatment. To the extent that the area is safe, patients should be treated and stabilized at the accident scene, but if the safety of the rescuer or patient is jeopardized, then the patient may have to be moved to a safe area for treatment. Periodic roof-rib

evaluations should be conducted to ensure the area remains safe to work in.

Two key elements to consider as related to emergency extrication are: The rescuer should coordinate the handling of extrication activities and adequate support personnel should be available to stabilize all the patient's injuries to the extent possible.

Even though suspected neck-spinal injuries are treated during stabilization/transportation, the spinal cord must be protected in all accidents where the mechanism of the accident could have caused a spinal injury. As related to a roof-rib fall accident, the patient should be handled as if they have a spinal injury, until proven otherwise.

If emergency movement is necessary prior to stabilizing a patient, then the head should be maintained in a neutral, in line position. With the head maintained in this neutral-in-line position, the body should be rolled or moved as a unit if such movement is necessary. Clothes drag is usually the quickest and probably the most effective emergency move that a rescuer can use on a patient with suspected spinal injuries that is lying down.

STABILIZTION AND TRANSPORTATION

As a rule, patients should be treated and stabilized at the scene if the area remains safe. Certain roof-rob entrapment situations could possibly require emergency movement of a patient to a safe work area after being freed from the entrapment.

One of the most important areas that must be remembered is that the airway, breathing and other body movements should be managed as if a spinal injury is present. In these types of accidents with suspected spinal injuries, the modified jaw thrust should be used to open and maintain the airway. Other injuries should be treated and stabilized, and the patient transported to a medical facility.

A rescuer should consider the safest type of transportation, extent of injuries and severity of injuries while planning patient transportation. In some situations, a choice of transportation may not be an option.

Q. What is the first consideration that a rescuer must always evaluate at the scene of an emergency that involves a roof or rib fall?

A. Personal safety, safety of assisting rescuers, and the patient to the extent safety will allow.

Q. A rescuer has arrived at the Scene of an accident where a person is entrapped underneath a roof/rib fall. The entrapped person has not responded to verbal communications from coworkers. The rescuer is not exactly sure of how to support the area and the safest direction from which to approach the patient. Who should the rescuer seek assistance from?

A. The mine / section foreman designated by the mine operator

Q. What should a rescuer do next at the scene of a roof/rib fall accident after the area is evaluated to be safe to enter?

A. Secure the scene as necessary; closely monitor the area to ensure more material does not fall on the rescue personnel or patient

Q. What would ordinarily be used as support material to secure the roof/rib, to gain safe access to a roof/rib fall patient?

A. Timbers, crib blocks, or safety jacks

Q. If safe to do so, where should an unresponsive patient injured in a roof/rib fall accident be stabilized and treated?

A. At the scene where the accident occurred.

Q. How should the airway be opened in a suspected unresponsive patient injured in a roof/rib fall accident?

A. Jaw Thrust - First Choice; If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift.

Q. What would be the most critical while treating a suspected unresponsive patient injured in a roof /rib fall accident?

A. How to treat and stabilize spinal injuries which should be suspected in all roof/rib fall accidents.

Q. An unresponsive patient found at the scene of a roof/rib fall accident requires moving to a safe location to stabilize and treat. In what position should the patient's head be maintained while moving?

A. The head should be maintained in a neutral-in-line position with the body, if possible; use (clothes drag) one - man, emergency move as is necessary.

Q A responsive patient has been injured in a roof/rib fall accident. The patient has serious head injuries and is complaining of numbness and tingling in the arms and legs. What type of treatment should this patient receive?

A. Treat for head, neck, and spinal injuries. stabilize on a backboard.

# MACHINERY AND EQUIPMENT ENTRAPMENT

## PERSONAL SAFETY

Machinery accidents are usually the second or third leading cause of fatalities across the nation. Machinery entrapment could present many dangers to a rescuer.

The first consideration that must be analyzed at the scene of any emergency is the safety of the rescuer and other assisting personnel. A rescuer must always remember that their personal safety and the safety of bystanders should be considered first. It's bad enough that one person has been injured, but the situation gets even worse when a rescuer or bystander becomes the second patient. Always size up the scene and evaluate any hazards that may exist while patient rescue attempts are being made.

Machinery entrapment/accidents could present multiple dangers for rescue personnel including electrical hazards, unintentional movement or falling of machinery, and possibly roof fall hazards.

A rescuer must always take the time to recognize apparent dangers and take the necessary safety precautions to prevent injury to himself or others at the scene.

## SECURING THE SCENE

Securing the scene is the second course of action that should be taken at the scene of a machinery entrapment. Making the scene safe helps ensure the safety of the rescuer and to every extent possible, the patient and others at the scene.

To the extent possible, electrical power should be de-energized on machinery involved with an entrapment accident. Even though electrical power may be needed to help remove a patient, a rescuer should get assistance from an electrician and a mine foreman to help determine if the scene is safe with electrical power on the machinery.

Machinery wheels should be blocked to prevent accidental movement and machinery raised to extricate a patient should always be securely blocked to help secure the scene. In addition to blocking machinery, roof support may also be necessary to secure the scene in certain situations.

## GAINING ACCESS

Gaining access is the third course of action that should be taken at the scene of a machinery entrapment. A patient may be entrapped underneath machinery or entangled in some machinery component. A rescuer should remember though, to the extent possible electrical power should be removed unless evaluated by a mine foreman and electrician and determined to be safe.

Even though electrical power on the machine may be necessary to help gain access to the patient, electrical power should be removed to the extent possible. Additional dangers such as shock hazards may be present if electrical power is left on.

The patient's location, types of injuries and severity of injuries should be evaluated while determining the safest means of gaining access to the patient.

If determined to be safe, a machine or machine component may have to be moved to gain access to the patient. Anytime a machine or machine component is raised, blocking material should be immediately available to secure the machine, if deemed necessary. Always be sure to have a qualified person move the machinery to prevent accidental movement in the wrong direction. A patient could be more seriously injured or killed if the machine is moved in the wrong direction.

A machine or machine component may have to be lifted or jacked up to gain access. Always remember though that if a machine must be raised or lifted, secure blocking must be installed as the machine is lifted to prevent accidental falling on the patient or rescue personnel.

## EXTRICATION

Extrication or removing a patient from entrapment occurs after a rescuer can safely gain access. Machinery entrapment accidents will require extrication before extensive first aid can be provided. To the extent possible, life-threatening injuries (RBB's) may be treated as soon as safely gaining access to a patient.

The type and severity of injuries must be evaluated to safely extricate or move an injured person. Two key elements to consider related to emergency extrication are: The rescuer should coordinate the handling/extrication activities and adequate support personnel should be available to stabilize all the patient's injuries to the extent possible.
Even though suspected neck-spinal injuries are treated during stabilization/transportation, the spinal cord must be protected while moving or handling any patient where the "mechanism" of the accident could have caused a spinal injury. The rescuer should protect the spine while extricating a patient if the accident could have caused a spinal injury. If a spinal injury is suspected, the head should be maintained in a neutral, in line position if moving the patient is necessary prior to stabilizing. Regardless of the situation, a rescuer must remember to support the head and protect the spinal cord as soon as possible if the accident could have caused a possible spinal injury. A clothes-drag is usually the quickest and most effective one person emergency move that a rescuer can use on a patient with suspected spinal injuries that is lying down.

## STABILIZTION AND TRANSPORTATION

As a rule, patients should be treated and stabilized at the scene, if possible, if the area remains safe. Machinery entrapment situations will most likely require moving a patient to an area where they can be treated and stabilized. If movement of a patient is necessary, safety precautions should be taken to protect the spinal cord if spinal injuries are suspected.

The first aid treatment for a machinery accident patient is generally the same as other types of accidents. The RBB's of first aid (Responsiveness, breathing, bleeding) should be followed. If a spinal injury is suspected, the airway, breathing and any other body movements must be managed properly to prevent further injury to the patient. The modified jaw thrust should be used to open and maintain the airway in a patient with a

suspected spinal injury. Other injuries should be treated and stabilized, and the patient transported to a medical facility.

A rescuer should consider the safest type of transportation, extent of injuries and severity of injuries while planning patient transportation. In some situations, a choice of transportation may not be an option.

Patients that have a suspected spinal injury should be stabilized and transported on a full-spine board. All unconscious patients, patients with head injuries, patients complaining of numbness, tingling in the arms and/or legs and other patients that you think may have a spinal injury should always be stabilized and transported on a spine board.

# UNDERGROUND MACHINERY AND EQUIPMENT RESCUE ACCIDENTS

Q. What is the first consideration that a rescuer should always evaluate at the scene of an emergency that involves machinery or equipment?

A. Personal safety, safety of assisting rescuers and the patient to the extent safety will allow.

Q. A Patient was run over by a battery scoop and is trapped underneath the scoop out of reach of rescuers. What should a rescuer do?

A. Lift the scoop with available means and block the scoop as raised, to prevent it from accidentally falling back down on the patient or the rescuers while extricating the patient.

Q. An unresponsive patient is found entangled in the pick breaker of a feeder. What should a rescuer do first?

A. Make sure the conveyor feeder is de-energized with assistance from the repairman and foreman before approaching the patient

Q. An unresponsive patient is trapped between a scoop bucket and the rib. The scoop operator has panicked, started crying and has gone to the surface. The scoop must be moved to extricate the patient. What should a rescuer do?

A. Check with the foreman and electrician and confirm that a competent person can move the scoop in the correct direction to prevent further injury to the patient.

Q. A person was operating a shuttle car and was rammed by another shuttle car that hung on point. The patient is responsive and complaining of neck pain and numbness/tingling in the arms and legs. What should a rescuer treat and stabilize for?

A. Spinal injury

Q. An unresponsive patient was hit in the head with a trailing cable as the shuttle car cable reel was taking up cable. The patient has blood and clear to pink watery fluid draining from the nose and ears. How should a rescuer open the airway?

A. Jaw Thrust would be the first choice. If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift.

Q. A slightly responsive patient was hit in the head with a miner conveyor boom. The patient is breathing normal and has bleeding from a laceration across the forehead. What type injuries do you suspect and how should the patient be treated, stabilized, and transported?

A. - Suspect head and spinal injuries; secure and transport on a Backboard.

Q. Which is a critical factor while determining the safest means of gaining access to an unresponsive patient entrapped between a shuttle car and the rib?

A. Patient’s location, type and severity of injuries, and a competent person is available to move the shuttle car if needed.

# UNUSUAL RESCUE SITUATIONS RELATED TO MINING

## Contact With Electrical Circuit

### Personal Safety

A patient in contact with an energized electrical circuit is one of the most dangerous situations that a rescuer may be confronted with. This emergency may be life-threatening to the rescuer and other would-be rescuers if not managed properly. A rescuer that comes in contact with an energized circuit whether it be direct contact with the energized object or a patient in contact with the energized circuit, may be seriously injured or killed.

As in all emergency situations, personal safety of the rescuer and others assisting in rescue efforts is the first consideration that must be analyzed. Reacting too quickly without properly evaluating the situation could result in serious injury or death to the rescuer or any other person that comes in contact with an energized circuit. Many coal miners commonly talk about receiving some type of electrical shock every day, but they never know when the next shock felt could cause an electrocution. Everyone must realize that any time that a shock is felt, enough current has passed through the body to cause death. The reason that all electrical shocks felt do not result in death is that the four major factors that could cause death are not present in the right combination. These four major factors are:

(1) the amount and duration of current traveling through the body
(2) the direction of current passing through the body (current Passing through the heart is the most dangerous)
(3) the body resistance and resistance to ground
(4) electrical cycle of the heart when current passes through it.

If a rescuer has any doubt about the safety of an electrical emergency scene, they should get assistance from a mine foreman and a certified electrician.

## SECURING THE SCENE

Securing the scene is the second course of action that should be taken at the scene of an electrical accident. Making the scene safe helps ensure the safety of the rescuer and to every extent possible, the patient and other personnel at the scene.

De-energizing the electrical power or having an electrician verify that a shock hazard does not exist is the most important element in securing this type of accident. Any person that touches a patient that is in contact with an energized circuit will be seriously injured or electrocuted. Therefore, it could save another person's life if it is verified by an electrician that a shock hazard is not present at the scene. As with other emergency scenes, rushing into an accident scene without making an accurate evaluation of the situation could cost you your life.

Always be cautious of a scene where a patient is in water that has an electrical circuit in the water such as a cable, pump, etc. The water may be energized and any contact with the water, pump, patient, etc. could result in electrocution.

While attempting to de-energize an electrical circuit, make certain that you have de-energized the correct circuit. Many mining personnel have been seriously injured and or electrocuted when they mistakenly disconnected an incorrect circuit.

## EXTRICATION

Extrication of a patient from an electrical accident scene does not involve anything other than standard emergency care except for de-energizing the correct circuit. De-energizing the correct electrical circuit cannot be overemphasized as this type of accident could be life-threatening to all personnel attempting to provide emergency care to a patient.

## STABILIZATION AND TRANSPORTATION

All patients should be treated and stabilized at the scene if the area remains safe to do so.

The first aid treatment for a patient involved in an electrical accident is generally the same as other accidents except that rescuers must be aware of certain injuries that could occur because of contact with an electrical circuit.

The RBB's of first aid (responsiveness, breathing, bleeding) should be followed.

Specific injuries that could occur that a rescuer must be conscious of are:

(1) cardiac arrest and/or heart abnormalities - could occur immediately or at any time
(2) shock
(3) muscle contractions
(4) trauma, fractures and/or burns at entry and exit points
(5) tissue injury far more serious than the surface appearance indicates.

A rescuer must also be conscious of the fact that an electrical shock could have caused a patient to fall and possibly caused a spinal injury. If the mechanism of the accident and evidence at the scene indicate possible spinal injury, then the modified jaw thrust must be used to open and maintain the airway. In addition, if a spinal injury is suspected, the patient must always be moved, rolled, or lifted as a unit to prevent further injury.

The patient should be secured and transported on a spine board, anticipating that a patient's condition could worsen at any time.

Monitor and treat the RBB's during transportation. Always be prepared to perform CPR and always have an AED available on this type of patient because cardiac arrest could occur at any time.

# Irrespirable Atmosphere

## Personal Safety

As with all emergency situations, the first consideration that must be evaluated at the scene of any emergency is the safety of the rescuer and bystanders. Miners have been killed and others have been disabled in Virginia when they entered an irrespirable atmosphere while attempting to rescue miners injured by an irrespirable atmosphere.

This situation is certainly life-threatening for would-be rescuers if proper gas and oxygen tests are not taken. This atmosphere should always be tested by a mine foreman with the proper gas and oxygen detection equipment before anyone enters such area to administer treatment to an injured person.

An irrespirable atmosphere is defined as an area with insufficient oxygen necessary to sustain life. Some miners refer to irrespirable air as blackdamp. What happens to a normal atmosphere to change it to an irrespirable atmosphere is that carbon dioxide and sometimes methane will displace the oxygen content. Normal air contains approximately 21% oxygen and as the oxygen concentration starts decreasing below 19.5%, various health effects occur to the body when breathed.

An irrespirable atmosphere is usually found in poorly ventilated areas, behind seals, old works, or old abandoned mines, and after a mine fire or explosion.

In the case of a mine fire or explosion, the oxygen is consumed by the fire or explosion, and, in addition, oxygen is displaced by the formation of carbon dioxide, carbon monoxide, nitrogen, etc. Some coal miners refer to the atmosphere following a mine fire or explosion as afterdamp, but for rescuer purposes, it is important to remember that the reduced oxygen concentration creates a life-threatening situation to any person who enters such area. In these type situations, the first reaction should be immediate evacuation using the emergency evacuation procedures.

Irrespirable atmospheres are most commonly encountered in the mining industry when a mine cuts into its own old works, old works of another mine, usually abandoned and behind mine seals. The effects that an irrespirable atmosphere have on the body as the oxygen content

decreases below 19.5% include labored breathing, faster breathing rate and a severe headache. All mining personnel should be aware and alert when mining near old works, old mines, sealed areas, etc. Mines in Virginia have cut into such areas even though the mine map showed such areas to be as much as 1500 feet away. A rescuer should be suspicious of a situation when coal miners are seen lying on the mine floor for no obvious reason especially when mining near areas where low oxygen or an irrespirable atmosphere could be encountered.

A rescuer must be conscious of the hazards of these mining situations when called upon to administer treatment to an injured person.

A rescuer should never enter such areas to administer emergency treatment to injured miners until such area has been evaluated, gas and oxygen tests made, and determined to be safe by a mine foreman designated by the mine operator.

A rescuer must always remember that even though the area has initially been determined to be safe, it could change from second to second. It could be life-saving important that continuous monitoring of such area be conducted to ensure the area remains safe while administering care to an injured person. This monitoring of oxygen and mine gases should be conducted by a mine foreman designated by the operator while using the proper instruments.

Remember, never enter such area until evaluated and determined to be safe by a mine foreman designated by the operator and always keep in mind that this situation could change from second to second.

It is important to be able to respond and treat an injured person, but a bad situation can become much worse if a rescuer or bystander becomes a second or third patient, etc.

## GAINING ACCESS

While attempting to gain access to the area to help an injured person, a rescuer must be accompanied by a designated mine foreman who has the proper instrumentation to conduct proper oxygen and gas tests. A rescuer should never enter such area until such mine foreman evaluates the area to be safe and is directed by such foreman to render emergency

care to an injured person. Remember that these type situations most commonly occur when one mine cuts into old works of the same or another mine or when a mine cuts into a sealed area. Even though irrespirable atmospheres have been encountered in other situations, these are the most common, especially in small, drift mines.

Gaining access to a patient in this type of situation is usually not hindered by physical obstructions.

Always remember that the main consideration to evaluate before attempting to gain access in this situation is the safety of the atmosphere.

## STABILIZATION AND TRANSPORTATION

A rescuer must always remember that to treat, stabilize and prepare a patient for transportation may take a few minutes and that the mine atmosphere in this situation could change from second to second. For this reason, a designated mine foreman should continuously monitor the atmosphere while a patient is being treated and prepared for transportation.

Serious trauma such as fractures, etc. usually is not present in this situation. A rescuer could expect to encounter unconscious patients, patients with breathing problems and cardiac arrest due to the low oxygen content in this type of atmosphere. A rescuer should be prepared to open and maintain open airways, give artificial respiration and CPR.

Unconscious patients recovered from this type of atmosphere must be secured and transported on a full spine board. As with all types of unconscious patients, transportation should be expedited as quickly as possible in a safe manner while continuing to monitor and treat the patient as their condition may require.

Q. What is the first consideration that a rescuer must always evaluate at the scene of an emergency that involves suspected contact with an electrical circuit?

A - Personal safety, safety of assisting rescuers and the patient to the extent that safety will allow

Q. What is a major factor that determine whether an electrical shock results in an electrocution?

A. The amount and duration of current traveling through the body, the direction of current passing through the body, the body resistance and resistance to ground, and the electrical cycle of the heart when current passes through it

Q. An unresponsive patient was attempting to make a splice on a shuttle car trailing cable. This section has four shuttle cars operating. The Rescuer is not sure about which circuit breaker to de-energize. Who should a rescuer get assistance from to confirm the correct circuit is de-energized prior to touching the patient and or equipment or circuit?

A. The repairman (electrician)

Q. An unresponsive patient is found lying in a water hole at a belt drive that has the belt drive cable lying in the water. What should a rescuer do?

A. Get assistance from the repairman (electrician) and mine foreman to verify the power is de-energized on the belt drive cable before you or anyone else contacts the patient and or the water area

Q. An electrician was working on top of the high voltage substation building located on the surface. The building is eight (8) feet high. When you arrive, the patient is lying on the ground and appears to be unresponsive. How would you open the airway for this patient?

A. Jaw Thrust would be the first choice. If Jaw Thrust is not effective, then attempt using Head Tilt - Chin Lift

Q. After checking responsiveness and evaluating breathing, what is the treatment required for the patient in question No. 5?

A. Treat and stabilize for spinal injuries

Q. A patient received a suspected electrical shock. What serious conditions should a rescuer recognize and be prepared to treat?

A. Cardiac arrest, respiratory arrest, possibly serious breathing problems, and injuries associated with entrance and exit wounds

Q. What safety precautions should a rescuer consider if a person has come in contact with an electrical circuit?

A. A patient in contact with a suspected energized electrical circuit is a very dangerous situation. Reacting too quickly could also put the rescuer in a dangerous situation also.

Q. What is your first consideration when a situation involves a suspected irrespirable atmosphere?

A. Personal safety, safety of assisting rescuers and the patient(s) to the extent that safety will allow.

Q. What safety precaution should always be taken before a rescuer enters a suspected irrespirable atmosphere where a patient is located?

A. A Mine Foreman must ensure the proper gas and oxygen tests have been made and that the area evaluated is safe to enter

Q. In what areas would a rescuer suspect to contain an irrespirable atmosphere?

A. In old works or old abandoned mines, behind mine seals, In poorly ventilated areas, and after a mine fire or explosion

Q. What effects does an irrespirable atmosphere have on mining personnel?

A. Labored breathing, faster breathing rate, and headache.

Q. What is correct as related to a suspected irrespirable atmosphere area?

A. A rescuer should be suspicious of a situation when miners are seen lying on the mine floor unresponsive for no reason, especially if mining near old works, old mines, or seals.

A rescuer must always remember that even though the area has been determined to be safe, it could change quickly and should be monitored continuously for deadly mine gases by a Mine Foreman while rescuers are working in the area

An irrespirable atmosphere is an area that does not contain sufficient oxygen to support life

Q. What treatment should a rescuer anticipate when a patient is found in a suspected irrespirable atmosphere area?

A. Unresponsive patient(s)
Patients with breathing problems; respiratory distress
Patients in cardiac arrest

# POISONOUS, TOXIC, AND HAZARDOUS MATERIALS

Poisonous, toxic, and hazardous materials are not uncommon and may be of many different types, including chemicals, solids, liquids, or gas.

What is a hazardous material?

Materials are considered hazardous if it is

A - Specifically listed in the law 29-Code of Federal Regulations Part 1910, Subpart 2, Toxic and Hazardous Substances
B - Assigned a threshold limit value (TLV) by the American Conference of Governmental Industrial Hygienists
C - Determined to be cancer causing, corrosive, toxic, an irritant, a sensitizer, or has damaging effects on specific body organs

These materials are appropriately named because they represent a hazard to everyone exposed - rescue personnel as well as the injured persons.

Personal safety is the first consideration for any person trained to provide emergency first aid. The worst thing that can happen at the scene of an accident with injured people is for the would-be-rescuer to become a victim. A patient certainly needs help but if a hazardous materials accident is not handled carefully, the would-be-rescuer and other involved personnel can become casualties.

Never attempt to take any action beyond your level of training. Know and respect what you are capable of safely doing and never hesitate to call for help. To wait for properly trained assistance is most often the correct course of action when hazardous materials are involved.

Always remember - be a part of the solution, not a part of the problem. When responding to a hazardous materials incident, a rescuer cannot follow those move fast, take action, and save lives instincts. Adequate time must be taken to assess the scene prior to entering any area where injured persons are located. This means identifying the hazardous material, total hazard area, finding a safe location for other personnel and taking self-protective measures against contamination.

The Chemical Transportation Emergency Center better known as CHEMTREC is the nationally known agency responsible for providing information on chemicals and hazardous materials. CHEMTREC provides information warnings and guidance for safe emergency management of hazardous materials if the Department of Transportation (DOT) identification number, chemical name or product name, to provide assistance. The information must be accurate.

CHEMTREC operates 24 hours a day, seven days a week and can be contacted by calling 1-800-424-9300.

The following information should be provided to CHEMTREC when hazardous materials are involved in an accident:

(1) Your name and return telephone number
(2) Location and nature of accident
(3) Identification number, chemical name, or product name of material (all of this data should be provided if available)
(4) Container type, size, quantities, etc.
(5) local conditions surrounding the incident, fire, spillage, etc.

This training information is divided into the following three major areas:

On-scene assessment
Identifying hazardous materials
Securing the scene/establishing a hazard zone.

## ON-SCENE ASSESSMENT

When dealing with hazardous materials, hazards may not be obvious. Approach the scene very cautiously. Resist the urge to rush in; you cannot help others until you know what you are faced with. Observe the incident scene very carefully while approaching. Be alert to signs of leakage such as sounds of escaping gas, evidence of liquid leaks, odd smells, vapor clouds and any evidence of fire. Fires can intensify the effect of some hazardous materials and may even cause some to explode. Sometimes the dangerous nature of the situation is not recognized until rescuers and other people have been injured while attempting to provide first aid or extricate injured persons from an emergency scene. Never attempt to rescue an injured person or retrieve documentation from a scene, building, etc. until the situation is assessed by a specifically trained person and evaluated to be safe.

Upon arrival at the scene, recognize the presence of toxic, poisonous, or hazardous materials, protect yourself and others, secure the area and call for assistance of properly trained personnel as soon as possible. Rescuers and others have lost their lives or become permanently disabled because of a lack of understanding of potential dangers associated with hazardous materials. Bystanders should be kept away. Very often, well-meaning people may try to help and become victims.

Even though rescuers and others trained to administer emergency first aid are oriented in rapid response at the scene of an accident, the first step in a toxic, poisonous, or hazardous materials incident is to make an accurate assessment of the situation. Safety of the would-be-rescuer and others around the scene is the primary concern. Rescuers and others at the scene should not become casualties.

Only those people with specialized training should enter a hazardous environment. Some hazardous material incidents may involve small quantities of toxic materials whereas other situations may involve barrels, boxes, or tanks of such chemicals.

The following safety precautions should be followed when approaching a hazardous environment:

Test the wind and approach the scene from the upwind direction.

Never drive or travel into vapor clouds or smoke from the scene (vehicles are an ignition source).

Isolate the accident scene for at least 250 feet in all directions and even greater distances if large quantities of materials are involved.

Do not allow other personnel to gather around the incident scene

Avoid contact with all chemicals and materials.

Never enter a building or other area containing hazardous materials where an incident has occurred prior to evaluation by a Hazardous Materials Coordinator.

Never walk into or touch spilled material.

Avoid inhalation of fumes, smoke, and vapors, even if no hazardous materials are known to be involved.

Never assume that smoke, gases, or vapors are harmless because of a lack of smell because odorless gases or vapors may be harmful.

Also, upon arrival at the scene of a poisonous, toxic, or hazardous material incident and after verifying that such materials are involved, immediately notify the appropriate county sheriff's dispatcher that is located at the local sheriff's office. The county dispatcher will notify the applicable county Hazardous Materials Coordinator.

If available, the following information should be provided to the county dispatcher:
(1) Exact location of the incident - town, road number, etc.
(2) Type of situation involved
(3) Known or suspected injuries and number of unaccounted for people
(4) Presence of fire or suspected fire, spilled liquids, vapor leaks, etc.

These HAZ-MAT Coordinators have specialized training in the management of hazardous materials and can determine when a scene is safe to enter. Upon arrival of a HAZ-MAT Coordinator, brief such person with all known information about the incident.

## IDENTIFYING TOXIC, POISONOUS OR HAZARDOUS MATERIALS

It is very important to identify the substance (s) involved in any incident. Accurate identification of the materials is critical. Placards, container labels, MSDS information and/or knowledgeable persons on the scene are valuable information sources. Note the information on the labels, placards, and numbers present, if possible. This information will assist in identification of the material and necessary safety precautions that must be taken. Evaluate all possible sources of information before you place yourself at risk or allow others to be at risk.

Material safety data sheets, currently known as SDS (Safety Data Sheets), are information sheets designed to inform you about the hazards of materials that you work with so that you can protect yourself and others. The Federal law requires SDS's for all hazardous materials and that they must be accessible for those personnel who may need such information.

The purpose of an MSDS is to tell you:

A - The material's physical properties or fast acting health effects that make it dangerous to handle
B - The level of protective gear needed to enter such are
C - The first aid treatment to be provided when exposed to this material
D - The preplanning needed for safely handling spills, fires, etc.
E - How to respond to such incidents

MSDS information from various manufacturers may look different but all must contain the following information:

A - The material's identity, including its chemical and common names (for example, brand name: Clorox; chemical name: sodium hypochlorite. common name: bleach)
B - Hazardous ingredients (even in parts as little as 1%)
C - Cancer-causing ingredients (even in parts as small as 0.1%)
D - List of physical and chemical hazards and characteristics
E - List of health hazards, including acute effects such as burns or unconsciousness and chronic effects such as allergic sensitization, skin problems, or respiratory disease, which build up over a period.
F - Limits to which a worker can be exposed, the primary entry routes into the body, specific organs likely to sustain damage, and medical problems that exposure can worse
G - Precautions and safety equipment
H - Emergency and first aid procedures
I - Identity of the organization responsible for creating the sheet and date of issue

An understanding of how to interpret the data on the MSDS is your best defense against accidents and injury. Knowing which data a proper MSDS should include will help you find it more quickly. The law states very clearly that the supplier must include complete data on the MSDS.

Hazardous materials must be identified with a warning label. Some occupational poisons or toxic materials may not be labeled with a hazardous material placard but must have a label that identifies such material as poisonous or toxic. A HAZ-MAT Coordinator may also be able to provide information on poisons and toxic materials, so if in doubt, contact the HAZ- MAT Coordinator through the applicable county sheriff's dispatcher.

All hazardous materials must be identified with a warning label that identifies the substance or material. This label may contain a picture, information or a four-digit identification number. The information displayed on the label is critically important in evaluating hazards associated with the material.
If possible, without jeopardizing personal safety, obtain this information and communicate to CHEMTREC and the HAZ-MAT Coordinator. MSDS information can also be used to gather this data.

Never risk personal exposure to poisonous, toxic, or hazardous materials while attempting to identify a placard, label, etc. Use available information from labels, placards, MSDS's or knowledgeable mining personnel familiar with the presence of such materials. Each county has an Emergency Response Plan designed to help a HAZ-MAT Coordinator identify and manage hazardous material incidents in their respective county.

## SECURING THE SCENE/ESTABLISHING A HAZARD ZONE

Without entering the immediate hazard area, do what you can to isolate the area to assure the safety of rescuers, and other people. It's bad enough that a person has been injured in a poisonous, toxic, or hazardous material incident but it's even worse for a rescuer or other person to become a victim of such situation. Always remember, it's important to rescue an injured person but don't complicate the situation by having more victims. Ensure the area remains isolated to prevent unauthorized entry. Keep all non-involved personnel away from the scene at a safe distance.

Assist other emergency personnel, if available, in establishing a hazard zone to prevent vehicles and unauthorized personnel from entering the danger area. Be cautious of vapor clouds, smoke clouds, and especially wind direction. While establishing a hazard zone, maintain a safe distance such that if the wind direction changes, rescuers and other personnel will not be endangered by vapor clouds, smoke clouds, etc. Be cautious and avoid low lying areas around a hazardous material accident because toxic fumes could settle in such areas.

## POISONOUS, TOXIC AND HAZARDOUS MATERIALS (PTH)

Q. What is the first consideration that a rescuer must always evaluate at the scene of an emergency that involves a suspected poisonous, toxic, or hazardous material?

A. Personal safety, safety of assisting rescuers, and the patient's safety

Q. Which is correct as related to a suspected hazardous materials incident?

A. Do not attempt to take any action beyond your level of training

Q. Which agency provides information, warnings, and guidance on how to manage a hazardous materials incident?

A. Chemical Transportation Emergency Center (CHEMTREC)

Q. What information is necessary to report to CHEMTREC when reporting a hazardous materials incident?

A. Your name and telephone number
Container type, size quantity, etc.
Location and nature of the incident

Q. What information would you need to manage a hazardous materials incident?

A. MSDS (Material Safety Data Sheet)

Q. What information is provided on Material Safety Data Sheets?

A. The material's physical properties and fast-acting health effects
The level of protective gear needed to enter an affected area
First aid treatment to be provided when exposed to this material

Q. What additional information would be provided on Material Safety Data sheets?

A - The material's identity, including chemical and common name, hazardous ingredients, cancer causing ingredients, list of physical and chemical hazards, and list of health hazards.

Q. What information may be identified on a hazardous materials warning label?

A. Information on the material or a Four - digit identification number

Q. Which information may you need in a hazardous materials incident?

A. Use available information from labels, placards, MSDS's and knowledgeable emergency personnel to help manage the incident