Wilderness First Aid and Survival

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Trauma and Accident Management

General Guidelines

Respond to accident in a systematic and organized fashion. The following is a step-by-step approach that you can follow when providing first-aid to an injured patient.

1) Maintain self-control: It is normal to feel anxious when confronted with an injured victim; however, this should not be transmitted to the patient or other members of the party. Try to act with confidence. Reassure any victims. Think before you act.
2) Control the scene: Before approaching the victim, ensure the safety of yourself and the non-injured members of the party. Assess the scene for further hazards such as rockfall, avalanches, or dangerous animals. Avoid approaching the victim from directly above if there is a possibility of a rock or snow slide. Do not allow your sense of urgency to transform an accident into a risky and foolish rescue attempt.
3) Organize an effective team. Designate a leader. This person should subsequently direct all first-aid efforts and delegate duties, rather than perform them, when possible. If the leader becomes intimately involved in a specific function, he loses the ability to maintain a team effort.
4) Perform a primary survey: This is a rapid evaluation in which life threatening conditions, such as airway compromise or severe bleeding, are recognized and simultaneous management is begun. Speak loudly to the victim as you approach. A response indicates that he is breathing and has a pulse. If the victim is not responsive, begin with the ABC's of resuscitation.
5) Initiate and maintain spine precautions: If a patient is unconscious after trauma or has neck or back pain, the rescuer should immobilize the head and neck and prevent any movement of the torso. A cervical collar can be improvised from a sleeping pad or rolled up clothing, while rolled up towels and clothing are placed on either side of the head and neck to further prevent any movement.
6) Perform a secondary survey: The secondary survey is a head to toe examination of the patient, looking for evidence of injury.
7) Protect the victim: If it is cold, place insulating garments or sleeping bags underneath and on top of the victim to protect him from hypothermia. Remove and replace any wet clothing. If it is hot, loosen the victim's clothing and create shade. If the victim is in a dangerous area, move him to a safer location while maintaining spine immobilization if indicated.
8) Plan the evacuation: Plans for evacuation should be initiated early. The leader should evaluate the victim's injuries, party size, and terrain. Develop a plan for either evacuating the patient or obtaining professional assistance.

Primary Survey

A = Airway

Immediately determine if the patient is breathing by placing your ear and cheek close to the victim's mouth and nose to try to detect air movement. At the same time, look for movement of the chest and abdomen. In cold weather, look for a vapor cloud or feel for warm air movement. If no movement of air is detected, clean the mouth out with your fingers and open the airway, using the chin lift or jaw thrust maneuver to prevent unnecessary movement of the neck. The jaw thrust is performed by placing your hands on either side of the victim's face and pushing the base of the jaw up and forward. The most common reason for airway obstruction in a semi-conscious or unconscious victim is relaxation of the muscles of the tongue and throat, which allows the tongue to fall back and obstruct the airway.

B = Breathing

If the patient doesn't breathe on his own after establishing an airway, as described above, then begin mouth-to-mouth resuscitation.

C = Check for circulation

Place your index and middle finger on the victim's throat over the Adam's apple and then slide your fingers down the side of the victim's neck to the space between the Adam's apple and neck muscle to palpate the carotid pulse. Hold your fingers here for at least 30 seconds and feel for any pulsations. If no pulse is detected, mouth-to-mouth resuscitation should be combined with chest compressions.

Check for Severe Bleeding

During the primary survey, evidence of severe bleeding should be identified and controlled with direct pressure. Do not allow the bleeding to continue while looking for a sterile dressing. Use whatever is available initially while someone else obtains sterile dressing material. Place the sterile dressing material over the wound and maintain direct and firm pressure. This will stop the bleeding in nearly every situation. A pressure dressing can be applied later with a 4x4 gauze dressing and elastic bandage to free up your hands.

Choking – Obstructed Airway

Choking is a life-threatening emergency that occurs when something obstructs the victim's airway so that he cannot breathe. Choking is suspected when an individual suddenly becomes agitated and clutches his throat, especially while eating. He may be unable to speak and begin to turn blue.

Treatment:

1) Perform the Heimlich maneuver by reaching around the victim's waist from behind and placing a clenched fist with the thumb-side against the abdomen above the navel and below the rib cage. The fist should be grasped with the other hand and then pulled forcefully into the abdomen and upward with a quick thrust. If unsuccessful, the procedure should be repeated.
2) If the victim becomes unconscious, the victim should be positioned on his back and the rescuer should perform the Heimlich maneuver while kneeling over the victim's thighs. The rescuer should use the heel of his hand instead of the fist.
3) If still unsuccessful, sweep the mouth with one or two fingers to try to remove any foreign material.
4) If spontaneous breathing doesn't return or the obstruction can't be removed, begin mouth-to-mouth breathing.

Cardiopulmonary Resuscitation (CPR)

The information provided here is only a reminder and not a formal manual on the technique of CPR (cardiopulmonary resuscitation). This lifesaving technique requires training and practice on special mannequins. It should be formally learned by everyone. The American Heart Association and the American Red Cross offer courses in CPR.

Traditional CPR is the combination of mouth-to-mouth resuscitation (rescue breathing) and chest compressions, and it is suitable for those with recent CPR training. Compression-only CPR involves only chest compressions, and it is just as effective on adult patients. If you do not have CPR training our doubt your ability to perform rescue breaths on an adult patient without adversely affecting chest compressions, perform compression-only CPR. If a victim is found unconscious, begin by checking for the ABC's (A=Airway, B=Breathing, C=Check for circulation).

How to Perform Rescue Breathing

1) Check for breathing. If the victim is not lying on his back, gently roll him over, moving the entire body as a unit.
2) Open the airway using a chin lift or jaw thrust technique if no breathing is detected. Sweep two fingers through the victim's mouth to remove any foreign material or broken teeth.
3) If breathing doesn't start pinch the nostrils closed and place your mouth over the victim's mouth.
4) Blow air into the victim until you see the chest rise.
5) Remove your mouth to allow the victim to exhale passively.
6) Repeat this cycle every five seconds for adults and every three seconds for children.
7) If air doesn't move in and out of the victim's mouth easily or chest movement isn't detected, push the victim's jaw from behind further into a jutting out position to prevent the tongue from falling back. If breathing doesn't occur, use the Heimlich maneuver as you would for an obstructed airway.
8) During rescue breathing, the victim's stomach will normally fill with air, resulting in vomiting. If this occurs, logroll the patient in a manner that maintains cervical spine precautions. Clear the airway.
9) Feel for the carotid pulse to determine if the heart is beating. If there is no pulse, begin chest compressions along with mouth-to-mouth breathing.

How to Perform Chest Compressions

1) Place the patient on his back on a firm surface and position the heel of one hand over the center of the breast bone and the heel of the second hand over the bottom hand, interlocking the fingers.
2) The rescuer's shoulders should line up directly over the victim's breast bone with the elbow's straight.
3) Using a stiff arm technique, the breast bone is compressed one and one-half to two inches and then released. Using a smooth motion, the compression phase should equal the relaxation phase, with a rate of 80 compressions per minute. Don't remove your hands from the victim's chest between compressions. If two rescuers are working together, the second rescuer should give the victim mouth-to-mouth resuscitation forcing a breath into him every thirty chest compressions. If a single person is performing the rescue, either perform compression-only CPR or alternate thirty chest compressions with two breaths. Continue to administer CPR until help arrives or the rescuers become too exhausted to continue. During CPR, the rescuer should check every few minutes for return of a pulse or spontaneous breathing.

Shock

Shock is a life-threatening condition in which blood flow to the tissues of the body is inadequate and cells are deprived of oxygen. Any serious injury or illness can produce shock. Examples are external or internal bleeding, femur or pelvis fracture, major burn, dehydration, heart attack, allergic reaction, or spinal cord injury with paralysis. The skin may be pale, cool, clammy and cyanotic (bluish). The pulse is weak and rapid (thready), and the blood pressure is low or undetectable. Breathing may be shallow, rapid, or irregular. Mental status may be altered (confusion, restlessness).

Treatment: There is little that the rescuer can do in the field. The important thing is to recognize shock so that transportation to a medical facility isn't delayed.

1) Keep the patient lying down.
2) Keep the patient covered and warm. Remember to insulate him from the ground as well.
3) Control any obvious signs of bleeding.
4) Loosen any restrictive clothing.
5) Splint all broken bones.
6) Don't give the patient anything to eat or drink.

Hypothermia

Hypothermia is an abnormally low body core temperature due to exposure to a cold environment. Core temperature typically refers to a temperature taken rectally.

Mild Hypothermia

Symptoms: A mildly hypothermic individual maintains a normal level of consciousness, is alert, has normal or only slightly impaired coordination, and is usually still shivering. The victim may act and think slower than usual, but there is no major alteration in mental status.

Treatment:

1) Remove the victim from the cold environment.
2) Replace any wet clothing with dry insulated garments.
3) Insulate from the ground.
4) Add an external heating source. Examples include: heated blankets; drinking warm fluids; hot water bottles or well-wrapped chemical heat pads placed alongside the neck or chest, under the armpits, or in the groin; a sleeping bag with a person inside who has a normal temperature; a campfire; and use of a camp stove to boil water and create steam inside the tent for inhaling warm humidified air.
5) Food and warm drink containing sugar should be given so that the individual can generate more internal heat ("Feed the Furnace").

Warning: To avoid burns of the skin, use caution in applying external heat sources. Test the temperature of heat packs or external warming devices on your own skin first, before placing them on a hypothermic individual. Victims with a significantly altered mental state shouldn't be allowed to eat or drink because of the potential for choking and vomiting. Complications are uncommon in victims of mild hypothermia if the condition is recognized and treated early.

Profound Hypothermia

Symptoms: Core (rectal) temperature is below 90F/32C. The victim has an altered mental state (disorientation, confusion, combative or irrational behavior, or coma). The victim is uncoordinated (unable to walk a straight line, heel to toe without stumbling), may become very weak and lethargic, and shivering is usually absent.

Treatment: Victims who are profoundly hypothermic are in danger of sudden cardiac arrest. When the heart cools to this degree, it becomes very irritable and prone to electrical abnormalities which can rapidly lead to death. Rough handling of the victim increases the potential for this complication. Therefore, profoundly hypothermic victims should be handled carefully and gently when removing wet clothing and performing other first-aid measures. First-aid treatment is aimed at preventing any further cooling and at stabilizing the victim. Put the patient in a sleeping bag or place blankets or clothing underneath and on top of him. Aggressive rewarming in the field isn't recommended unless evacuation is delayed for a long period. Rewarming is best done in a controlled environment, such as a hospital intensive care unit, because of the potential complications associated with profound hypothermia. Professional assistance is usually needed in the evacuation of a profoundly hypothermic individual.

Caution: First-aid management of hypothermic victims shouldn't be based solely on measurements of body temperature, because obtaining an accurate temperature in the field is difficult. It's only one consideration along with other observations and diagnostic signs (such as an altered mental state), in guiding the decisions about appropriate treatment.

It may be difficult to distinguish between someone who is profoundly hypothermic and someone who is dead. The profoundly hypothermic person may have a pulse that is barely detectable. The American Heart Association's standards call for a one-minute continuous check for pulse in a hypothermic individual, since the heart rate may be very slow. In the field, someone shouldn't be declared dead if he is suspected to be hypothermic.

Heat Exhaustion and Heat Stroke

Heat stroke is the final stage of heat exhaustion, when the body can no longer cool itself adequately. It's important to recognize when heat stroke is present, because a delay in treatment can be fatal.

Heat Exhaustion

Typical symptoms of heat exhaustion are:

1) Flu-like symptoms (malaise, headache, weakness, nausea, and loss of appetite)
2) Vomiting
3) Dizziness when standing up from a sitting or lying position
4) Dehydration
5) Core temperature may be normal or slightly elevated (usually less than 104F/40C)
6) Sweating is present
7) Normal mental state

Treatment:

1) Stop all exertion and move the victim to a cool and shaded environment.
2) Remove restrictive clothing.
3) Administer oral rehydration solutions with plenty of water.
4) Ice or cold packs, if available, should be placed alongside the neck, chest wall, under the armpits and in the groin. Fanning while splashing with water, or soaking in cool water are other cooling methods. (Don't place ice directly against skin for prolonged periods to avoid inducing frostbite.)

Heat Stroke

Heat Stroke is a true medical emergency. Heat stroke that isn't rapidly treated can kill. The difference between heat stroke and heat exhaustion is that victims with heat stroke have abnormal changes in their mental state and neurologic functions. These include confusion, disorientation, bizarre behavior, loss of coordination, seizures, and coma. Sweating may still be present in heat stroke. Dry, hot skin is a very late finding and may not occur in some victims. Therefore, anyone who has a temperature above 106F/41C and altered mental state should be considered to have heat stroke whether or not he is still sweating.

Typical symptoms are:

1) Elevated temperature (usually above 105F to 106F/40.5C to 41C)
2) Altered mental state (confusion, disorientation, bizarre behavior, seizures, coma)
3) Rapid heart rate
4) Low blood pressure
5) Rapid breathing
6) Sweating present or absent

Treatment:

1) Cool the patient as quickly as possible. Place ice or cold packs alongside the neck, chest wall, under the armpits and in the groin. Wet with lukewarm water, and fan rapidly to facilitate evaporating cooling. Immerse in cool water if available.
2) Don't give anything to drink because of the risk of vomiting and choking.
3) Tylenol and aspirin aren't helpful in environmental heat stroke and shouldn't be given.
4) Treat for shock while maintaining a cooling environment.
5) Evacuate immediately to the closest medical facility. Continue to cool along the way until patient temperature falls to 100F to 101F/37.7C to 38.2C.
6) Re-check the temperature at least every 30 minutes.

Wound Management

Bleeding

Bleeding can be stopped nearly 100% of the time by applying direct pressure over the wound. Although it's best to use a sterile dressing from your first-aid kit, initially use whatever is available, such as clothing, to apply pressure when the bleeding is serious. Applying direct pressure on someone's neck if it's bleeding poses the problem of interfering with breathing, so the wound may need to be pinched carefully to stop bleeding in this area. Never apply direct pressure to the eye if there is an injury to the eyeball.

Cleaning

The preferred method to clean a wound is by mechanical irrigation, using a stream of saline or other non-toxic solution such as clean water or a dilute povidone iodine solution

Wound Closure

If the wound is small and clean, or on the face, it can be closed with wound closure strips or butterfly bandages, after thorough irrigation. First, apply a layer of benzoin to either side of the wound to increase the adhesiveness of wound closure strips. Allow the benzoin to dry (about 30 seconds). Avoid getting it into the wound because it will sting. Apply the wound closure strips (or butterfly bandages) by first applying them to one side, then pulling the wound closed so that the edges just match, and then pressing the strips down on the other side to hold the edges together.

Dressing the Wound

The best initial dressing for a wound is non-adherent. First apply a small amount of antiseptic or antibiotic ointment to the wound. Then apply the non-adherent dressing directly over the wound, making sure to cover it completely. Next, place an absorbent sterile 4x4 or 2x2 over the non-adherent dressing and hold this in place by wrapping a conforming bandage around the wound (if it is located on the arm or leg). If the wound isn't on an extremity, simply tape the dressing to the skin on all four sides.

Wound Infection

All wounds should be examined at 24 and 48 hours for any signs of infection. These include: red streaks around or near the wound, increasing redness, pain, or swelling at the wound site, pus draining from the wound, or generalized fever.

If the wound looks infected, remove any closures which you have applied. Allow any pus or discharge to drain. If the wound is on an extremity, it's best to keep it splinted and raised above the level of the heart to minimize swelling. Seek professional medical attention as soon as possible.

Burns

General treatment for burns includes: remove victim from the source of the burn, check for breathing and if absent start mouth-to-mouth breathing, cover the victim's burn with a cool wet cloth. Do not use butter, ointments, or any other home remedy and avoid breaking blisters.

All burns have the potential to become infected. The area should be watched closely for any sign of complication or infection. See wound management. Consult a physician regarding all second and third degree burns.

First-Degree Burn

This involves only the outermost layer of skin. It causes redness of the skin without blistering. It can be quite painful. When a large area of the skin is involved, the individual may feel ill with chills or fever.

Treatment: Cool the burn with wet, cold compresses (don't use ice directly), apply aloe-vera gel topically to the burn, and administer anti-inflammatory drugs such as ibuprofen (600mg = three tablets) or aspirin.

Second-Degree Burn

This is a deeper burn, resulting in both redness and blistering. These tend to be very painful. A large area of second-degree burn can impair the body's ability to thermoregulate and lead to hypothermia and dehydration.

Treatment: Irrigate gently with cool water or saline to remove all loose dirt and skin. Apply aloe vera gel topically to the burn. Cover the burn with a non-adherent dressing. If the burn involves the face, eyes, hands, genitals, or an area greater than five percent of the body surface, the victim should be transported to a medical center as soon as possible.

Third-Degree Burn

This involves the entire skin thickness including nerves, blood vessels, and even muscle. Although these are the most serious burns, they aren't often painful because the nerve endings have been destroyed. The edges may still be painful, since a second degree burn can exist adjacent to the third-degree area. The appearance is usually dry, charred, and leathery.

Treatment: irrigate gently with water or saline and cover with a non-adherent dressing. All third-degree burns are serious and must be seen as soon as possible by a physician.

Blister Care

Management of Intact Blisters

1) Leave blisters intact to reduce the chances of infection.
2) Place a piece of moleskin with a doughnut cut out for the blister on the skin using tincture of benzoin to help increase adhesiveness. If using moleskin, it must be thick enough to protect the blister. This may require several layers.

Management of Ruptured Blisters

1) Cut away the dead skin with your scissors.
2) Clean the area with an antiseptic towelette or first aid cleansing pad.
3) Apply a non-adherent dressing to the blister site, such as GlacierGel, a non-adherent sterile pad, or a 2x2 gauze pad with triple antibiotic ointment.
4) Place a ring of moleskin with a central hole the size of the blister around the site. Use tincture of benzoin to increase adhesiveness along the edges. Secure everything with tape. Change the dressing daily or every other day.

Nosebleed

Nosebleeds can originate from the front of the nose (anterior) or the back (posterior). Bleeds from the back usually drain into the throat and can be very difficult to control. The victim should be immediately evacuated to a medical facility. Fortunately, anterior nosebleeds are more common and much easier to control. Pinch the fleshy part of the nose and hold it for at least 15 minutes. On releasing pressure, refrain from blowing the nose. If bleeding should continue, gently but firmly pack both nostrils with sterile gauze impregnated with triple antibiotic ointment. This is facilitated by cutting the gauze into strips.

Insect Bites and Stings

Venom from insects can produce severe allergic reactions and lead to life threatening anaphylactic shock.

More commonly, insect bites and stings are only painful and produce local inflammation (redness, swelling) at the site. Ice or cold packs will help alleviate local pain and swelling. AfterBite® sting relief swabs found in the Adventure Medical Kits will help relieve pain and inflammation when applied topically. Oral antihistamines, such as diphenhydramine are helpful in relieving the itching, rash, and swelling associated with many insect bites and stings. The principles of wound care apply for bites and stings as well. Any bite or sting can become infected and should therefore be examined at regular intervals for progressive redness, swelling, pain, or pus accumulation.

Bee Stings

Honey bees leave a stinger and venom sack in the victim after a sting. Hornets, yellow jackets, bumble bees, and wasps don't leave a stinger and may puncture a victim repeatedly. Pain is immediate and may be accompanied by swelling, redness, and warmth at the site.

Treatment: In allergic individuals, anaphylactic shock can occur, and must be treated immediately with epinephrine and antihistamines. Remove stingers or venom sacks from honey bee stings by scraping them free from the skin or by using a splinter picker or tweezers. Be careful not to squeeze more venom into the victim. Apply ice or cold water over the sting site. Apply AfterBite® sting relief swab to the sting site. Administer 25-50mg (one to two tablets) of diphenhydramine for progressive itching, swelling, or redness.

Embedded Foreign Objects

Splinters

The fine needle-point Splinter Pickers are ideal for removing embedded foreign objects in the skin. They shouldn't be used for removing any object from the eyes or ears. After removing the embedded object, clean the area with an antiseptic wipe (preferably containing benzalkonium) and place a protective dressing over the site. If you haven't had a tetanus shot within the last ten years, obtain one as soon as possible.

Ticks

Ticks are common in the wilderness environment. Ticks cause human disease either by transmitting infectious organisms during their bites or by secreting toxins or venoms. Even after a tick attaches, disease transmission may be prevented by prompt removal. The tick should be grasped as close to the skin or surface as possible with the splinter pickers (tweezers), taking care not to crush, squeeze, or puncture the body. Steady straight upward traction is the best technique for removing the tick. Twisting isn't recommended, as it can break off and leave behind mouth parts. Traditional folk methods for removing ticks such as applying fingernail polish, petrolatum jelly, rubbing alcohol, or a hot match head increase the chance that the tick will salivate or regurgitate into the wound, thus spreading infection. After removal, disinfect the bite site with an antiseptic towelette containing benzalkonium.

Fish Hooks

Gently scrub the area around the entry of the fish hook into the skin with an antiseptic towelette or soap and water. A fish hook with a barb embedded in the skin can be removed using one of two methods.

1) Push the hook through the skin until the barb appears. Cut the fish hook shaft with wire cutters or scissors. Now pull the remainder of the fish hook (pulling the barbed end) through the skin.
2) Pass a string around the end of the hook. Then press shank of hook against the skin surface. Pull fish hook from the skin by simultaneously yanking the string and pressing the shank against the skin surface. Clean the two holes thoroughly using an antiseptic towelette. Cover the holes with a dry dressing. Watch for signs of infection: swelling, redness around the wounds, generalized fever, pus, and/or red streaks extending from or around the wounds.

Sprains and Strains

A sprain is a stretching or tearing of ligaments that attach one bone to another. Symptoms include tenderness at the site, swelling, bruising, and pain with movement. Since these symptoms are also present with a fracture, it may be difficult to differentiate between the two. When in doubt, always treat as you would for a suspected fracture.

Sprains

The acronym RICE is a useful mnemonic for the treatment of sprains. Resting takes the stress off the injured joint and prevents further ligament damage. Ice reduces the swelling and eases pain when used "correctly." For ice therapy to be effective, it must be applied early for up to 20 minutes at least three to four times a day, followed by compression bandaging. Short term application of cold therapy, as is often done with a chemical cold pack, may temporarily delay swelling but in the long run will actually increase it!

Compression wraps also reduce swelling and provide some support. A compression wrap can be made by placing some padding (socks, gloves, pieces of your sleeping pad) over the sprained joint and then wrapping it with an elastic bandage. Monitor the extremity for numbness, tingling, or increased pain, which may indicate that the compression wrap is too tight and should be loosened.

Anti-inflammatory drugs such as ibuprofen are helpful in relieving pain and reducing inflammation. A dose of 400mg (two tablets) three times a day with meals for three to four days is adequate. Elevate the injured joint above the level of the heart as much as possible

Strains

A strain is an injury to a muscle or its tendon. The tendon connects the muscle to the bone. Strains often result from over-exertion, or lifting and pulling a heavy object without good body mechanics. Strains can sometimes be disabling, especially in the back. Symptoms and treatment are initially the same as for sprains.

Fractures

A fracture is a broken bone. An open, or compound, fracture occurs when the overlying skin at the fracture site has been punctured or cut. This can occur from sharp bone ends protruding through the skin or by a direct blow which breaks the skin as it fractures the bone. The bone may or may not be visible in the wound. A closed fracture is one in which there's no wound in the skin anywhere near the fracture site.

How to Diagnose a Fracture

It may be difficult to differentiate a fractured bone from a sprained ligament or bruised muscle. When in doubt, splint the extremity and assume it's fractured until you can obtain an x-ray. Features that indicate a possible fracture are:

1) A deformity where the limb appears in an unnatural position. Compare the injured limb with the uninjured limb on the opposite side. Look for asymmetric shortening, angulation or rotation.
2) Severe tenderness over a specific point.
3) Inability to use the extremity. For example, someone who twists his ankle and is unable to bear weight should be suspected of having a broken rather than a sprained ankle.
4) Rapid swelling and bruising (black and blue discoloration).
5) Crepitus (grating): A grinding sensation can sometimes be felt and heard when there is a fracture.
6) False motion: Motion at a point in a limb where no joint exists indicates a fracture.

Treatment of Fractures:

General guidelines: Inspect the site, looking for any deformity, angulation, or damage to the skin. Instead of removing the victim's clothing, take your bandage scissors and cut away the clothing at the site. This will prevent excess movement and better protect the victim from the environment. Any fracture may have associated nerve or blood vessel injury. Check the circulation below the fracture site by feeling for pulses and inspecting for abnormal color changes. Pallor or bluish discoloration may indicate an injury to a blood vessel. Without circulation, a limb can only survive about six to eight hours. Check sensation by using a safety pin to determine if the sharp sensation is felt equally on both extremities. Because of the force necessary to break a bone, any person with a fracture should be examined carefully for other injuries.

All fractures should be splinted before the patient is moved unless the patient's life is in immediate danger. Splinting decreases the movement of the broken bones, preventing additional injury to muscles, nerves, and blood vessels. It also reduces pain, prevents a closed fracture from becoming an open one, and makes it easier to evacuate the victim.

In general, the splint should incorporate the joints above and below the fracture. Use plenty of padding and always check the pulse and circulation after applying a splint or doing any manipulation. If possible, fasten the splint on the uninjured body part and then transfer it to the injured area to minimize pain.

Splints can be improvised from material available in the wilderness. Examples include: ski poles, canoe and kayak paddles, aluminum stays from internal frame backpacks, ice axes, life jackets, sticks or tree limbs, tent poles, or dirt filled fanny packs. The SAM Splint, available through Adventure Medical Kits, is an ideal multi-purpose lightweight splint.

Remove all constrictive jewelry and elevate the injured part as much as possible to minimize swelling. Administer pain medicines to the victim if available. Check the limb often to make certain that swelling inside the splint hasn't cut off circulation.

Head Injury

Head injuries can be divided into three groups:

Prolonged Unconsciousness

Loss of consciousness for more than ten minutes is a serious warning of significant brain injury. Assess the patient's airway and perform rescue breathing if necessary. Because there is a potential for associated neck injuries with head trauma, any person with a serious head injury should have the cervical spine immobilized. Immediate evacuation to a medical center is mandatory.

Brief Loss of Consciousness

Short term unconsciousness, where the victim wakes up after a minute or two and gradually regains his normal mental status and physical abilities, is termed a concussion. Confusion or amnesia for the event and repetitive questioning by the patient are common. Keep the patient under close observation for the next 24 hours. Normal sleep should be interrupted every two to three hours to briefly see that the victim's condition hasn't deteriorated. The victim should be evacuated to a medical center immediately.

HEAD INJURY CHECKLIST (IMMEDIATE MEDICAL EVALUATION IS NEEDED):

1) Headache which progressively worsens.
2) The patient's level of consciousness gradually deteriorates from being alert to becoming drowsy or disoriented, or he lapses back into unconsciousness.
3) Persistent or projectile vomiting.
4) One pupil becomes significantly larger than the other.
5) Bleeding from the ears or nose without direct injury to those areas or clear watery fluid draining from the nose.
6) Bruising behind the ears.
7) Seizure.

No Loss of Consciousness

If a person hit his head but never lost consciousness, he will rarely incur a serious injury to the brain. There may be bleeding from the scalp and a large bump on the head, which can be treated with direct pressure and an ice bag. If the victim develops any signs or symptoms on the head injury checklist, he should be evacuated to a medical facility immediately for further evaluation.

Allergic Emergencies

Allergic emergencies can occur from exposure to insect stings, food allergies, medication use, with severe asthma, and for unknown reasons. The most severe form of an allergic reaction is anaphylactic shock, which can be life threatening within minutes after contact with the substance to which the individual is allergic.

Symptoms include hives, wheezing, chest tightness, shortness of breath, and a drop in blood pressure leading to dizziness and fainting. The soft tissues around the larynx or trachea may swell, making it difficult or impossible for the person to breathe.

Treatment of Severe Allergic Emergencies

Anaphylactic shock is characterized by significant involvement of the respiratory system, making it very difficult or impossible for the victim to breathe. In the event of anaphylactic shock, there's no time to get the victim to the hospital from the wilderness. People with bee sting or other serious allergies should carry injectable epinephrine (adrenaline) with them at all times. Epinephrine is available in a spring-loaded injectable cartridge called the Epi Pen (Center Laboratories). This allows for self-administration of the medicine without dealing with a needle and syringe. Instructions for use accompany the kits. For children, there is an Epi Pen Jr. which contains one-half the dose of the adult injection. Obtaining epinephrine requires a prescription from your doctor. After the patient has responded to the epinephrine, administer Benadryl (diphenhydramine) 50mg orally every four to six hours. Diphenhydramine is an antihistamine which may prevent re-occurrence of the severe allergic reaction. Transport the victim for medical evaluation immediately, as an anaphylactic reaction can recur, despite administering drugs.

Treatment of Mild Allergic Reactions

Not all allergic reactions are life threatening. Often one may only develop hives (red, raised skin welts) and itching without breathing problems, chest tightness or a drop in blood pressure. These reactions may be managed with Benadryl (diphenhydramine) alone. The adult dose is 50mg every four to six hours. The major side effect of this medication is drowsiness.

One should consult with a doctor prior to travel so the best medication can be prescribed for a specific condition and a treatment plan can be developed. Anyone known to have allergies who travels in the wilderness away from medical care should carry epinephrine. Guides or others who are responsible for providing first-aid to clients and friends, as well as people traveling with children whose allergy status is unknown, should also carry epinephrine.

Abrasion (Road Rash) Management

An abrasion occurs when the skin surface is scraped off. This is a common injuring among bicyclists, in-line skaters, rock climbers and skateboarders. Abrasions differ from lacerations in that they don't require suturing. Abrasions often have dirt, gravel, and other debris embedded in the skin. If the dirt isn't fully removed, this may lead to scarring, tattooing of the skin and infections.

Treatment:

1) Gently clean off any loose foreign material with water, normal saline or other available irrigation solution. An improved irrigation system can be prepared by filling a plastic bag with water or normal saline, and then poking one or two holes in the bottom of the bag with a safety pin. Squeeze the top of the bag to create a forceful stream to flush away any loose foreign material from the wound.
2) Wipe the abrasion with an antiseptic towelette. Vigorously scrub the abrasion until the foreign material has been removed from the wound. Although this is a very painful process, it's necessary so that pieces of dirt or gravel don't remain embedded and produce permanent markings that may later require surgical removal.
3) Use a splinter picker or a tweezer to remove stubbornly embedded particles.
4) After scrubbing, rinse the wound once again with water or other cleansing solution.
5) Use a sterile gauze pad to hold direct pressure over the abrasion to stop any residual bleeding.
6) Apply a thin layer of triple antibiotic ointment or aloe-vera gel to the abrasion.
7) Apply a protective non-adherent dressing and bandage.
8) Inspect the wound daily for any sign of infection. This includes redness around the wound, swelling, increased pain, or cloudy fluid collecting under the dressing. If this occurs, remove the dressing to allow drainage. Consult a physician as soon as possible.

SURVIVAL INSTRUCTIONS

Don't Panic

If you find yourself lost or in a survival situation, take a deep breath, try to relax, and remain calm. Use the acronym: STOP

S- Stop: Do not travel farther until you assess your situation.

T- Think: Should I stay here or move? What is the likelihood that I will be found here? How far am I physically able to travel?

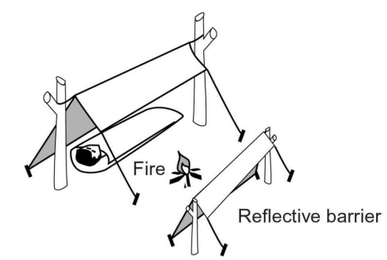
O- Observe: Look around and determine whether you can obtain shelter, water, and fuel for a fire at this location.

P- Plan: Decide what you should do and take action. Staying put may be the best choice, especially if someone knows where to look for you.

Shelter

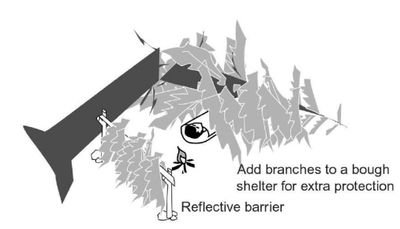
- Get out of the elements as soon as possible (stay dry and warm).
- Your first line of sheltering is your clothing. If you do not have adequate clothing, stuff leaves and other debris into your clothes as insulation to reduce heat loss.
- You can wrap your survival blanket around you, make it into a sleeping bag and cover it with debris for warmth, or use it to make a shelter (Figure 1).

Figure 1
TARP LEAN-TO,
FIRE & HEAT REFLECTOR WALL



- Avoid making shelter near running water. It is colder than higher ground or areas away from water and can drown out sounds of rescuers.
- Avoid making shelter where there is danger of an avalanche, runoff, mud slides, or falling rocks or branches.
- Look for naturally occurring shelters such as a cave, a rock overhang, the inside of a hollow log, or the space under the low-hanging limbs of a tree or a partially fallen tree (Figure 2).
- Keep your sleeping area small for warmth.
- Use debris or some form of insulation under you to prevent heat loss.
- A reflector wall in front of your shelter reduces wind exposure and will reflect heat from a fire (Figure 1).
- In snowy areas, make a snow trench for shelter. (1) Dig a trench about the length and width of your body, and about 2 ½ feet deep. (2) Place insulation (sleeping pad, survival blanket, boughs, debris) on the floor of the trench. (3) Lay your skis, ski poles, tree limbs, or evergreen boughs over the trench (Figure 3). (4) Cover framework with a tarp, survival blanket, or large snow blocks. (5) Place at least 1 inch of snow on top. (6) Maintain an air hole for ventilation.

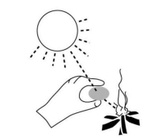
Figure 2
FALLEN TREE SHELTER



Fire

- Choose a site that is out of the wind, protected from rain, and cleared of fire danger.
- The driest wood is dead lower tree limbs, off the ground, in sheltered areas.
- Dry grass, leaves, pine needles, shredded bark, small twigs, rope, twine, paper, and cardboard can be used as tinder to start a fire.
- When your only alternative is to start a fire on top of the snow, build a platform of rocks or green logs to prevent the fire from sinking into the snow.
- You will need about 10 armloads of wood to keep a fire going all night. Collect all your wood prior to starting your fire.
- If you do not have matches, you can start a fire by focusing sunlight through a lens on tinder or by sparking battery wires (Figure 4).

Figure 4
FIRE IGNITION SOURCES



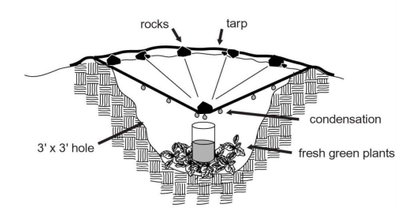
Signaling

- The first step toward being rescued is making your location known to rescuers. You need to be seen or heard.
- Identify your location using a signal mirror (Figure 5), fires, bright-colored clothing, a flashlight, a whistle, gun shots, etc.
- Groups of three (fires, whistle blasts, X's) are an international distress signal.
- In uninhabited areas, artificial geometric patterns such as straight lines, circles, triangles, or X's will stand out and be noticed.
- Try to signal from high, open ground.

Water

- You can live about 3 to 5 days without water. If survival forces you to drink from a stagnant or muddy pool, remember that it is better to drink dirty water than to die of dehydration. Strain muddy water through a cloth.
- Thirst is a poor indicator of dehydration. Do not wait until you are thirsty to drink. Drink plenty of water whenever it is available. If water is not available, do not eat.
- Look for water in low-lying areas or depressions. In dry areas, plants with green, leafy growth indicate a water source. Dig down a couple of feet and wait for water to accumulate in the pit.
- Collect rainwater in your survival blanket and channel it into a container.
- Do not eat unmelted snow or ice. A day or two of this can make your mouth swell and prevent eating or drinking. Your body also gives up heat to melt snow or ice.
- Do not drink seawater, alcohol, or urine.
- Make a solar still:
  1. Dig a hole about 3 feet wide and 2 ½ feet deep in a low area with good sun exposure.
  2. If available, place green, leafy vegetation in the hole to increase moisture content.
  3. Place a wide-mouthed container on the bottom of the hole.
  4. Cover the hole with your survival blanket so that it dips down toward the center of the hole.
  5. Cover the hole with your survival blanket with sand or dirt so that there is an airtight seal.
  6. Center a small rock in the middle of the blanket over the container. Water will condense on the underside of the blanket and drip into the container.

Figure 6
COLLECTING WATER IN SOLAR STILL



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