

Chapter 10

Mountaineering First Aid

This chapter provides guidelines for the prevention and first-aid treatment of the most common medical problems and emergencies encountered by mountaineers. Many of these techniques must be practised: one is unlikely, for example, to apply artificial respiration correctly in an emergency unless one has practised the technique beforehand.

The chances are that you will be called upon to use your first-aid skills at least once during your hiking career. All active mountaineers, trip leaders in particular, are therefore very strongly urged to complete one or more of the certificated first-aid courses presented by St John's Ambulance, the National First Aid League, and other organisations.

The treatment of an injured person in the wilderness is complicated by the lack of 'adequate medical supplies and the need to evacuate the injured person. However, the aim of the first aider is not to provide comprehensive medical treatment, but to stabilise the patient's condition and so enable him to survive evacuation. Furthermore, most medical problems experienced in the outdoors are not life-threatening. A basic knowledge of first aid will therefore also allow you to deal successfully with most minor ailments, helping to contribute to a safe and enjoyable trip.

Individual approaches to some of the injuries dealt with in this chapter might differ from the procedures suggested here. Furthermore, serious accidents seldom cause a single injury, which sometimes means that two injuries occurring close together require conflicting treatments. For example, if one injury requires that the casualty be placed on his back, but another that he should be in the recovery position, you will have to decide which injury is more serious, or needs the more urgent treatment, and then deal with the injuries accordingly. In any emergency the information supplied here will therefore have to be supplemented by your own common sense.

Many medical emergencies arise as a result of entirely preventable causes. Ensure that your party carries a medical kit that is sufficient to deal with most common emergencies: neglecting this precaution can cost lives. Since prevention is infinitely better than cure, your responsibility also extends to teaching the members of your party correct preventive procedures and fostering the caution and respect which the mountain environment demands,

Contents of this chapter

- The Scope of First Aid
- Medical Conditions (in alphabetical order for ease of reference) Burns
 - Cold injuries
 - CPR (cardio-pulmonary resuscitation) Eye injuries Fractures Heat injuries High altitude effects Joint and muscle injuries Obstructed airway, caused by a foreign body Shock
 - Snake, insect and other animal bites and stings Unconsciousness Wounds and other soft tissue injuries
- Other Medical Conditions
- A Final Word
- Appendix

The scope of first aid

1. Deal with the situation, apart from the casualty.
2. Diagnose the problem and give the correct first aid treatment,
3. Evacuate the casualty to professional medical help and notify those concerned.

Deal with the situation

1. Be calm and take charge.
2. Ensure safety from fire and water, the possibility of falling rocks, etc. Ask everybody not providing direct assistance to stand clear.
3. Give each person a specific job, e.g. sending for assistance, making splints, etc. Give sufficient information to persons going to seek help (see Chapter 11, Emergency Procedures).
4. Find out who has knowledge of first aid.
5. Ask for help in turning the casualty or in steadying a limb. Give exact instructions and, if necessary, first demonstrate how an action should be carried out.

Diagnose and treat

1. Decide whether to move the casualty or treat him where he lies. This will depend on what has happened, the degree of severity of the injuries, and circumstances such as the weather.
2. If you decide to move the patient, carry out a preliminary examination of the head and neck, spine and the four limbs.
3. Decide on the most suitable method of removal in view of the injuries and the amount of help available.
4. Complete the examination of the casualty for injuries so as to make a complete » diagnosis and carry out the necessary treatment. In arriving at the diagnosis, you should be guided by:

HISTORY — the report furnished by persons present (which includes the conscious casualty) as to the cause of the injury or illness;

SYMPTOMS — the account given by the casualty of his own sensations and feelings;

SIGNS — your complete examination of the patient.

5. Deal with injuries in order of priority:
 - Major bleeding enjoys absolute priority and must be controlled immediately.
 - Apply resuscitation if the patient is not breathing.
 - Restart the heart if it is not beating.
6. Dress wounds and immobilise fractures and large wounds before moving the patient.
7. Place the casualty in the most comfortable position, consistent with the requirements of treatment. Handle him gently to prevent further injury.
8. Guard against shock and look for concealed bleeding.

9. Reassure the patient and stay with him.
10. Protect him from the cold. Do not remove clothes unnecessarily — this can be painful and make the patient feel cold.
11. Do not attempt too much. Attend to the essential and prevent the situation from becoming worse.

Evacuate

1. If evacuation is considered necessary, arrange early for evacuation to a doctor or a hospital.
2. If in doubt whether the patient is alive or not, continue treatment until medical aid is available.
3. Never leave the patient alone while waiting for help to arrive.
4. See Chapter 11, Emergency Procedures, for evacuation procedures.

Burns

- Major burns
- Moderate burns
- Mild burns

Minor burns can occur easily during a hike, but they are fortunately easily treated. Major burns, on the other hand, cannot be treated successfully given the first aid kit and other means available to the average hiking party: the patient therefore requires immediate evacuation.

Burns can be classified according to their severity:

Major burns

- Blistering partial thickness burns of more than 25 per cent of body surface.
- Full thickness (whole skin, third-degree) burns, more than 10 per cent of body surface.
- Significant burns of critical areas — hands, feet, groin, face, eyes and ears. Significant trauma or associated disease accompany such burns.

Treatment

The life-threatening aspect of major burns is the massive fluid loss caused by tissue damage and subsequent shock. If intravenous fluid is available it should be administered. The volume to be administered is calculated according to the following formula: Weight (kg) x burnt surface area (%) x 3. For example, an 80 kg man with 30 per cent burns will need 7 200 ml intravenous fluid in the first 24 hours — half over eight hours and the rest during the next 16 hours. This estimate stresses the importance of evacuating the major burn patient immediately, since it is most unlikely that first aiders will be able to supply this volume of fluids.

Moderate burns

- Blistering partial thickness burns of 15-25 per cent of body surface.
- Less than 10 per cent third-degree burns.
- No significant areas burned.

Mild burns

- Blistering partial thickness burns of less than 15 per cent of body surface.
- Less than 2 per cent third-degree burns.
- No significant areas burned.

Treatment of moderate and mild burns

Patients with major and moderate burns need specialised hospital treatment and must be evacuated urgently.

1. Remove clothing and jewellery from wound.
2. Both small and large partial thickness wounds can be immersed in cold water to reduce pain and damage.
3. Clean wound gently with water and disinfectant soap and cover with anti-bacterial cream (e.g. Betadine cream) and paraffin gauze, if available.
4. Cover with 'cling wrap' or a plastic bag before covering with bulky dressing (e.g. thick gauze pads).
5. Apply crepe bandage. This bandage can be left in place until patient is evacuated or, if evacuation is unnecessary, for six to seven days.
6. If blisters are present when burn is reopened, they can be opened with sterile scissors (boil for 15 minutes) and the wound re-dressed.

General points of importance

- Gentle splinting of the burnt area reduces movement and therefore pain.
- Major and moderate burn patients should not receive fluids per mouth as they are inclined to vomit, resulting in more fluid loss.
- Give treatment for pain as needed: usually Codis is sufficient. Be careful not to overdose the patient. Remember that third-degree burns are usually painless as a result of nerve damage.
- Facial burns are often accompanied by smoke inhalation and damage to the lungs. This causes severe swelling and the patient can experience difficulty breathing. The patient must be evacuated with extreme urgency. Look for burns around the mouth, hoarseness and coughing up of sooty material. Keep the airway clear and give oxygen, if available.

Cold injuries

- Hypothermia
- Frostbite

Many deaths in the mountains have resulted from hypothermia. Helping to prevent cold injuries in his party is therefore an important duty of the leader.

Hypothermia

Hypothermia is a condition characterised by a decrease in body temperature to a level at which normal muscular and cerebral functions are impaired.

Prevention

- Know the factors that contribute to the onset of hypothermia and the symptoms of the condition; every member of the party should look out for the first signs of hypothermia in the other members.
- Always carry adequate wind- and waterproof clothing, even on one-day excursions (see Chapter 1, Camping Equipment and Chapter 8, Mountain Hazards).
- Always carry the essential survival kit listed at the end of Chapter 1.
- Seek shelter before the first symptoms of hypothermia appear.
- Watch out for early signs and symptoms.
- Put on all available clothing and rain gear. Huddle together.
- Consume adequate food and fluids.
- Do not allow the party to split up.

(See also the section on emergency bivouacs in Chapter 2.)

Factors that contribute to the onset of hypothermia

The four main causes of hypothermia: 'Cold, wet, wind, work.'

- **Cold:** Heat is lost by radiation, convection, evaporation and conduction, primarily from exposed skin. At temperatures below 5°C as much as 50 per cent of total body heat loss may be from an uncovered head or bare hands (this underlines the importance of covering your head before you feel cold). Dry clothing acts as an efficient insulator by trapping a layer of warm air.
- **Wet:** Water conducts heat away from the body over 200 times faster than air. Wet clothing therefore quickly loses its ability to prevent heat loss.
- **Wind:** The wind greatly increases heat loss, especially from exposed or wet skin.
- **Work:** Heavy physical exercise increases evaporation from the lungs and sweating, depleting body fluids and increasing heat loss.

Mild and severe hypothermia

For the sake of convenience, hypothermia can be dealt with under two headings:

- Mild hypothermia — body temperature above 32°C. The patient can still stand and walk without assistance.
- Severe hypothermia — body temperature below 32°C. The patient cannot stand or walk without assistance and is generally severely incapacitated.

Symptoms of mild hypothermia

The symptoms can be subtle and difficult to recognise. If the patient at any stage becomes unconcerned about his condition, refuses to be helped, or is uncooperative, this is a clear danger sign.

- **Sensation of cold**; skin numb, shivering; minor impairment of co-ordination and movement (36-35°C).
- More obvious **impairment of muscular co-ordination**; stumbling, generally lagging behind group; confusion, apathy (35-34°C).
- **Gross muscular incoordination**; frequent stumbling and falling; slow thought and speech (34-32°C).

Symptoms of severe hypothermia

If left untreated, the symptoms of mild hypothermia gradually worsen, leading to coma and death.

- Shivering stops (this is an important sign); severe incoordination; patient cannot walk or stand; incoherence, irrationality, confusion; typically the patient develops a sensation of extreme warmth, starts to undress and discards sleeping-bag (32-30°C).
- Severe muscular rigidity; semiconsciousness; dilation of pupils; inapparent heart beat and pulse (30-28°C).
- Unconsciousness; breathing and heart action stop; death (28-25°C).

Treatment of mild hypothermia

Recognise the condition. Treatment is relatively simple.

1. Obtain shelter (get out of wind and rain).
2. Change into dry clothing. Put on all available clothing. Cover the head and hands.
3. Produce heat — light a stove if possible.
4. Moderate physical activity, e.g. move around, step up and down on a log.
5. Eat small amounts of warm food at frequent intervals. Give warm drinks (no alcohol!) if possible.
6. Prevent recurrence.

Treatment of severe hypothermia

This condition is difficult to treat in the wilderness because rewarmed the patient rapidly with externally applied heat is a hazardous procedure and because the cold heart is very susceptible to changes in heart rhythm, which can be fatal. The method most likely to succeed is immediate evacuation by helicopter. The utmost care should be exercised when transporting the patient to a helicopter or shelter, since jolting can produce abnormal heart rhythms in the cold heart. If it is possible to evacuate the patient, rewarming should not be attempted before rescue. The cold body can withstand lack of oxygen better, and less damage will be done.

If immediate evacuation is not feasible:

1. Get the victim to shelter. Insulate him from the ground and, where necessary, erect a barrier in the form of a tent, space blanket, plastic bag or sheet or anorak to protect him against wind and rain.
2. Replace wet clothing with warm, dry garments.
3. Active rewarming: the patient should be warmed centrally, i.e. not his limbs, but only his body. Insulate the extremities (ears, nose, hands, feet) to protect them against frostbite, but do not warm them or rub the arms or hands of the patient, since this will cause the coldest blood in the extremities to be pumped to the body core.

An external source of heat must be applied — a sleeping bag provides insulation only, no heat. Pack the body with hot-water bottles or warm stones; be very careful not to burn the skin. A second person getting into the sleeping bag to provide warmth by direct body-to-body contact is an effective way of rewarming the patient.

4. Do not give the patient alcohol or warm liquids or allow him to move if he recovers slightly. He is and remains a stretcher case until the hospital is reached.
5. Evacuate as soon as possible to a hospital.

Remember: A patient suffering from severe hypothermia may appear dead, but 'a person should not be considered cold and dead before he has not been warm and dead.'

Frostbite

Frostbite is a cold injury in which the affected tissues are frozen. The extremities hands, feet, face and ears — are most commonly affected. The body responds to cold by the constriction of blood vessels in the affected areas, reducing circulation and thereby reducing the amount of heat lost by radiation. Body core temperature is thus conserved by reducing circulation to the extremities. Blood vessel constriction can become so severe that circulation almost ceases and the skin and the superficial tissues actually begin to freeze.

Prevention

- Make use of adequate clothing and equipment, particularly for the hands and feet.
- Maintain body temperature through exercise (or shivering). Take particular care with an accident victim who, though he may appear adequately clothed, may suffer from frostbite because he is immobilised.
- Take in sufficient food and fluids.
- Strictly abstain from alcohol and tobacco.
- Encourage blood flow to the extremities by loosening constrictive clothing.

Symptoms

- Initially: sensation of cold and pain in affected limb; pallor of affected skin.
- Later: skin becomes even paler; all sensation is gradually lost.
- In the case of deep frostbite, the tissues are hard.

After defrosting, mildly affected tissues are red for a few days. In more severe cases blisters develop, filled with clear or bloody fluid. After a week or more, badly frostbitten areas can turn black and the limb may have to be amputated.

Treatment

Only re-warm a frostbitten limb if the victim has reached a place where his entire body can be kept warm during and after treatment and from where he can be evacuated without having to use the injured extremity. Otherwise, rewarming should rather be done in hospital.

1. A tepid water bath (38-42°C) should be used for rewarming (the water should not burn the attendant's hand).
2. Remove limb from water bath and add hot water periodically to maintain the desired temperature. Put limb back only after thoroughly mixing the water and measuring the temperature. Do not let the injured limb rest against the sides or bottom of the container.

3. Continue warming for about thirty minutes or until tissue is soft and pliable.
4. Aspirin or a pain killer may be given for pain during and after rewarming.
5. Following rewarming, keep the patient warm and protect the affected limb from any further injury or irritation. Do not allow blisters that may have formed to be ruptured. Evacuate the patient to a hospital as soon as possible.

Under no circumstances should frostbitten tissues that have been rewarmed be allowed to become frozen again; it would do far less damage to walk on a frostbitten limb. Also, do not allow a frozen limb to defrost slowly. If it cannot be kept frozen, rather rewarm it quickly and evacuate the patient as soon as possible.

CPR (cardiopulmonary resuscitation)

- Rescue breathing
- Chest compressions

Cardiopulmonary resuscitation is an emergency lifesaving procedure that consists of the diagnosis and treatment of respiratory failure and heart failure, thus ensuring the continued adequate supply of oxygen to the brain. This condition requires an immediate and correct response if the person's life is to be saved: chances of survival diminish after four to six minutes.

Breathing and the heart function can fail simultaneously as a result of drowning, poisoning, choking, poisoning by gases or fumes, electric shock, or other causes. In the wilderness situation the most common causes are: electric shock caused by lightning, drowning, hypothermia, serious injury, for instance crushing by snow or rocks, and head injuries arising from a fall.

Only severe bleeding enjoys a higher priority than CPR. Stop the bleeding quickly by placing a compression bandage over the wound and bandaging it firmly with a bandage, torn shirt, or other improvised bandage.

If a neck or back injury is suspected, the patient should be treated as described under the section on fractures. At least try to splint the patient's neck before starting CPR. Do not tilt the neck backwards to open the airway, only pull the lower jaw forwards gently. Always use the 'log-roll' method to move the patient.

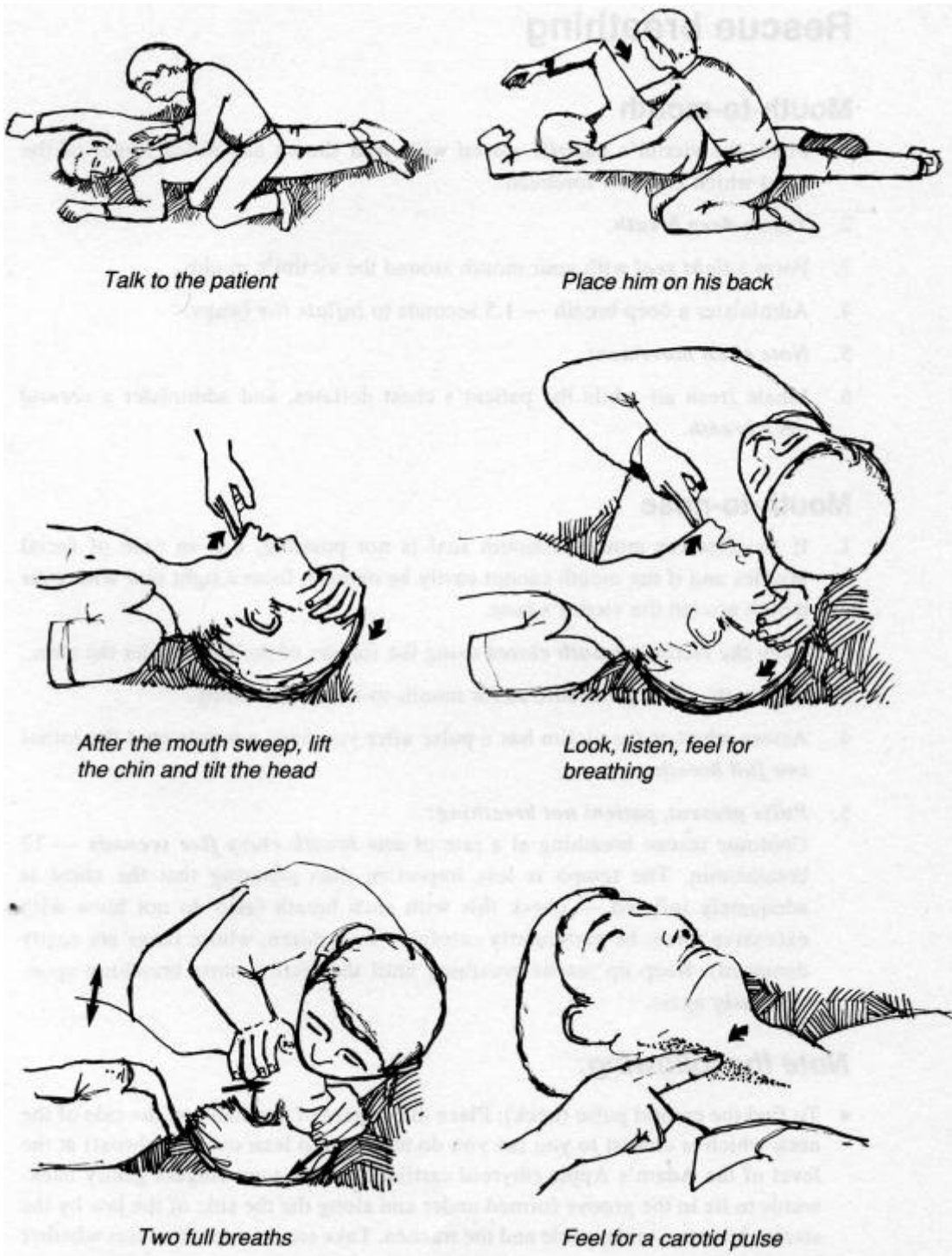
Immediate response

(The following procedure is the one recommended by the South African First Aid League.)

- A Airway** — must be open
 - B Breathing** — support or start rescue breathing
 - C Circulation** — chest compressions
 - D Do not delay** — start immediately
1. Assess the safety of the surroundings. Remove the patient immediately in case of fire, smoke or noxious gases. Disconnect any power source before touching the patient.
 2. Talk to the patient. Gently tap or shake his shoulder.
 3. At the same time ask someone to activate the emergency services.
 4. If the victim is unresponsive, place him on his back, considering the causes of the injury. Kneel

next to him.

5. Airway mouth sweep. Swiftly remove vomitus, food or foreign bodies from the victim's mouth by sweeping your index finger from one side of the mouth to the other.
6. Open airway. Head-tilt chin-lift manoeuvre: lift the bony part of the chin forward and tilt his forehead backwards with the palm of your other hand. (If a neck injury is suspected, hold the angles of the jaw with both hands; lift the jaw forward, opening the mouth by moving the lower lip down with your thumbs.)
7. Look, listen, feel for spontaneous breathing. Place your ear next to the victim's mouth while holding the airway open. Look for chest movement. Listen for breath sounds. Feel for movement on the side of your face. If after five seconds there is no evidence of breathing, start rescue breathing.



Rescue breathing

Mouth-to-mouth

1. Pinch the victim's nostrils closed with your thumb and index finger of the hand which is on his forehead.
2. Take a deep breath.
3. Form a tight seal with your mouth around the victim's mouth.
4. Administer a deep breath — 1,5 seconds to inflate the lungs.
5. Note chest movement.
6. Inhale fresh air while the patient's chest deflates, and administer a second deep breath.

Mouth-to-nose

1. If an effective mouth-to-mouth seal is not possible, e.g. in case of facial injuries and if the mouth cannot easily be opened, form a tight seal with your mouth around the victim's nose.
2. Keep the victim's mouth closed using the fingers of the hand under the chin.
3. Follow the same procedure as for mouth-to-mouth breathing.
4. Assess whether the victim has a pulse after you have administered the initial two full breaths.
5. Pulse present, patient not breathing:

Continue rescue breathing at a rate of one breath every five seconds — 12 breaths/min. The tempo is less important than ensuring that the chest is adequately inflated — check this with each breath (also do not blow with excessive force: be particularly careful with children, whose lungs are easily damaged). Keep up rescue breathing until the victim starts breathing spontaneously again.

Note the following:

- To find the carotid pulse (neck): Place the fingers of one hand on the side of the neck which is closest to you (so you do not have to lean over his throat) at the level of the Ad'am's Apple (thyroid cartilage). Slide your fingers gently backwards to lie in the groove formed under and along the the side of the jaw by the sternocleidomastoid muscle and the trachea. Take ten seconds to assess whether a pulse is present.
- Feel for a carotid pulse: the radial pulse may be difficult to detect in any collapsed patient.
- By ventilating the victim first with two full breaths, a weak pulse caused by hypoxia may be strengthened, allowing it to be detected more easily.
- Place fingers gently on the carotid pulse, so as not to occlude the artery and thereby diagnose pulselessness.
- Do not feel for a pulse with your thumb, since you may diagnose your own pulse rate by mistake.
- Feel for the presence of a pulse for a full ten seconds. If this step is rushed you may miss a slow, weak or irregular pulse, resulting in possible unnecessary cardiac massage and its complications.
- ***If no pulse is detected after the two full breaths — do chest compressions.***

Chest compressions

1. Hand position:

Follow the lower margin of the rib cage by running your fingers under the lower ribs until they meet in the midline. Two fingers above the tip of the breastbone (xiphisternum), place the palm of your other hand on the victim's sternum. The hand you used to measure off a two-finger width can now be placed on top of the hand already on the sternum. The fingers must point away from you and must be kept off the chest wall. Compression is applied with the heel of your hand.

2. Correct body position:

Keep your shoulders vertically above your hands, elbows and arms kept * straight. Use the weight of your upper torso to bear down on the sternum.

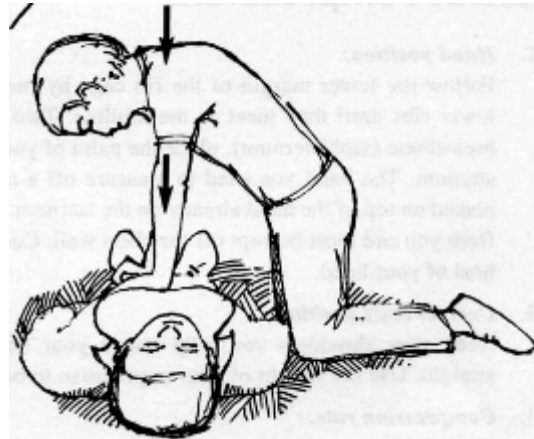
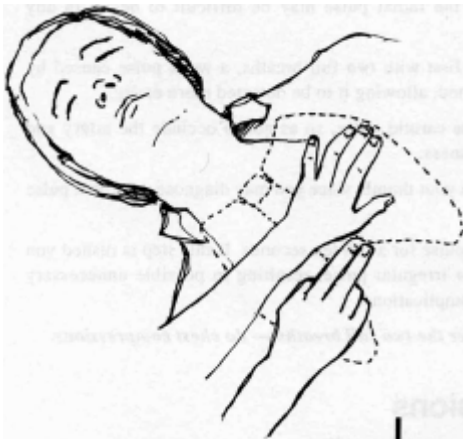
3. Compression rate:

80-100 compressions per minute. Achieve the correct rate by counting one and, two and, three and, up to fifteen.

4. Compression technique:

No pressure must be exerted on the sternum between compressions. Compressions must be performed in a smooth and rhythmical manner, with the duration of each compression being equal to the duration of relaxation. Compress the sternum to a depth of 4-5 cm.

5. After 15 chest compressions, open the airway and administer two full breaths.



6. Re-check hand position on sternum and do a further 15 chest compressions.

7. Repeat the cycle of two ventilations and 15 compressions four times.

8. Check for the return of a carotid pulse, taking five seconds to determine its presence.

9. If no pulse is detected, continue CPR — begin with A-B-C.

10. Check for a return of a pulse every few minutes, e.g. after every ten cycles of two ventilations and 15 compressions.

Important facts to remember during CPR

1. Check your hand position each time before applying compressions. Incorrect hand position results in inadequate circulation and possibly fractured ribs and injury to internal organs.
2. Keep elbows and shoulders straight, above the victim's sternum.
3. Avoid pressure on the sternum between compressions to allow the heart to fill before the next compression.
4. Open the airway before each breath.
5. Remember the sequence, Airway, Breathing, and Circulation.
6. Always provide rescue breaths before compressions. There is no point in circulating blood which does not contain oxygen to the brain.
7. Keep the victim's lower limbs elevated during CPR to enhance circulation to vital organs. The head and chest must be kept horizontal.

Summary of CPR

1. Observe the scene — remove the patient from immediate danger.
2. Assess patient — speak to him and gently tap his shoulder.
3. No response: open the airway. Look, feel, listen for breathing.
4. Not breathing: rescue breathing — two full breaths.
5. Pulse — feel carotid pulse.
6. 6.ft Pulse, not breathing — continue rescue breathing at a rate of 12 breaths/min.
7. No pulse — do CPR, two breaths, 15 compressions.

If the patient's natural pulse has resumed, stop the chest compressions. As soon as the patient attempts to breathe, co-ordinate ventilations with the patient's own efforts until breathing is regular. It is always difficult to decide when to stop an unsuccessful effort. If help is near, continue resuscitation until a trained person can assess the patient. If not, CPR must continue as long as there is the slightest possibility that the patient may recover. If, after half to three quarters of an hour of effective resuscitation, there is no sign of life, it is probably acceptable to stop efforts to revive the patient. Remember that drowning and hypothermia victims can survive much more extended periods of interrupted oxygen delivery and may need much longer periods of active resuscitation.

Eye injuries

Treatment — small foreign object in eye

1. Increased tearing will usually wash out the object.
2. If this does not happen, rinse the eye with clean water. The moistened corner of a clean handkerchief can be used to shift a small loose object gently off the eyeball.
3. Never rub the eye.

Treatment — penetrating injury

1. This is a very serious injury. Do not attempt to dislodge the object.
2. Make a doughnut bandage (shown) and place it over the injured eye. Place a covering bandage over both eyes, since movement of the healthy eye can also aggravate the damage.
3. Evacuate the patient as soon as possible on a stretcher after immobilising his head.

Treatment — snowblindness

(See section on heat injuries.)

Contact lenses

- Contact lenses, if left in the eyes of an unconscious patient, may cause damage. Check for contact lenses by gently opening the eyes and looking at the eyeball from the side — lenses are usually readily visible.
- Small hard lenses may be shifted gently to the white of the eye and left there.
- Bigger soft lenses should be removed by gently drawing the lower eyelid under the lens and lifting them out. Store them in a special container in the fluid provided.

Fractures

- Open fractures
- Closed fractures
- Back and neck fractures

Open fractures

At the fracture site there is an open wound from which bone ends may be protruding. Any movement of the injured limb will be extremely painful, and infection can very easily take place unless steps are quickly taken to disinfect the wound.

Treatment

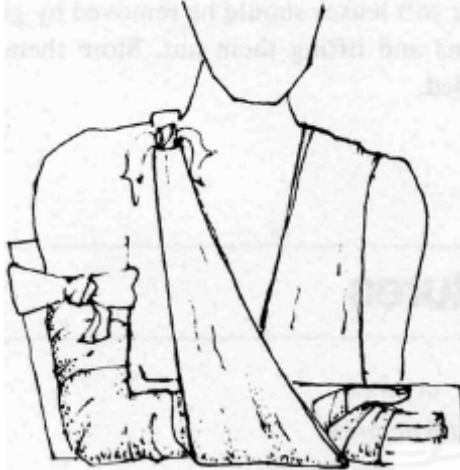
1. Clean the wound as described under the section on wounds. Work gently — any movement of the bone ends will cause extreme pain.
2. Dress the wound with a sterile wound dressing.
3. Never try to push the bone ends back into the tissue.
4. Splint as described below.

Closed fractures

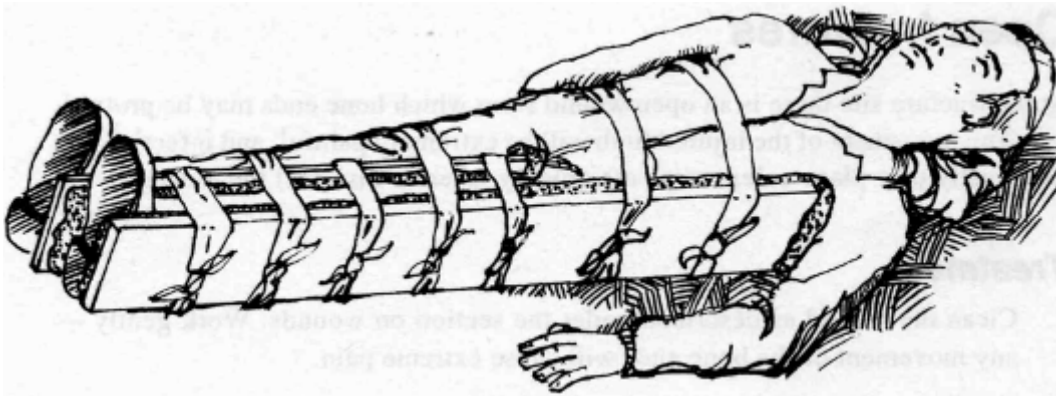
The bone is broken, but there is no open wound at the fracture site.

Symptoms

- Pain, which is increased by movement.
- Deformity — not always present.
- Discoloration — especially after a few hours.
- Inability to use limb.



Immobilising a broken arm



An immobilised fractured thigh

The main purpose of splinting is to immobilise the fractured limb

Treatment

(Always look for other injuries apart from the obvious one. Look for sites of bleeding, and stop any bleeding as described under the section on wounds.)

1. Make the patient as comfortable as possible and keep him warm before, during and after examination and treatment;
2. If the patient is conscious, give him a pain killer, e.g. Codis.
3. 'Splint them where they lie' — do not move the patient before the injured limb has been splinted, and move the limb as little and as gently as possible.
4. Improvise a splint, using wire, rucksack frames, tree branches etc.
5. Pad the splint well with clothes, sleeping bags, jackets, etc.
6. Place the splint to the side of the fracture.

7. Include the joints above and below the fracture in the splint.
8. Gently thread the fastening material (e.g. gauze bandages) under the limb and fasten them around the splint. Avoid elastic bandages, since they are easily fastened too tightly.
9. Always leave the toes and fingers open to allow the circulation to be checked. Check blood circulation regularly.
10. Ask the patient whether he is comfortable and reassure him.

Specific notes regarding fractures

- A broken wrist or forearm can be supported over the chest after splinting.
- A broken elbow must be splinted in the position in which it is lying and it should then be supported as best possible.
- A broken leg can be tied to the uninjured leg for additional support after splinting. The injured leg can even be splinted by tying it to the uninjured one.
- A fractured upper arm can be suspended in a sling and tied to the body.
- A person with a fractured thigh bone or pelvic bone is extremely seriously injured. He will lose a lot of blood, although this may not be visible externally, and he will probably go into shock. Treat him as described in the section on shock and organise emergency evacuation.
- Even a minor fracture, in combination with other circumstances such as cold weather, exhaustion or generally poor physical condition, may also lead to shock.

Back and neck fractures

Any person who has fallen even a short distance, or who has been hit on the head by a falling rock, may suffer from a back or neck fracture.

General

- Keep the patient warm and reassure him. Do not leave him alone.
- If the patient must be moved, use the 'log roll' method (described below).
- Evacuate him as soon as possible, using a rigid stretcher.
- If the patient requires artificial respiration, do not tilt the neck backwards to open the airway. Hook your thumbs behind the lower jaw and pull it forward. Clear the airway and provide artificial respiration without moving the patient's neck or head.

Incorrect handling of the patient could damage the spinal cord, resulting in paralysis or even death.



An immobilised suspected neck injury

Symptoms

- After a fall or being struck by a rock, the patient experiences pain in his neck or back, or he may complain of stiffness and inability to move limbs.
- If any suspicion of a neck or back injury exists, do not move the patient or allow him to move before proper splinting has not been done.

Splinting a neck fracture

1. Be extremely careful.
2. Do not bend the patient's head forward or sideways.
3. Make a neck collar by using a wire splint ten cm wide and 30 cm long and pad it well or use the padded hip belt of a rucksack. The splint must be stiff enough to prevent head movement.
4. Place a splint under chin and around to the back and fasten it at the back. It must be tight enough to restrict head movement but not to obstruct breathing. (Practise applying splint on a healthy person first.)

'Log roll'

The aim is to move the patient without twisting his body.

1. Use at least four people — one to support the head, two the body, one the legs.
2. The first aiders kneel beside the patient and gently roll the patient towards them, taking great care to support the head and keep the alignment of the spinal cord unchanged.

Heat injuries

- Heat cramps
- Heat syncope or faintness
- Heat exhaustion
- Heatstroke
- Sunburn
- Snowblindness

Through sensitive control mechanisms, normal body temperature is maintained within a narrow range between 36 and 38°C. Heat generated by metabolism is eliminated from the body primarily through the skin, through convection (by increased blood flow and vasodilation, or expansion of the blood-vessels) and through evaporation (promoted by perspiration). Acclimatisation to heat (through an increased maximum sweating rate and a reduction in the amount of salt lost in a given volume of sweat) takes about one week and results in an increased tolerance for exercise in a hot environment.

Remember: a member of the party who begins to behave strangely should never just be ignored. Depending on circumstances he may be suffering from heat or cold injury or even altitude sickness.

A number of medical conditions of varying degrees of seriousness are associated with a high rate of heat production and increased perspiration, coupled with an inadequate fluid and salt consumption.

Prevention

- A conscious effort must be made to replace fluid and salt losses (in extreme conditions up to eight litres of water a day may be required).
- Unacclimatised individuals in particular should avoid strenuous exercise during the hottest part of the day.

Heat cramps

Severe cramps affecting one or more muscles, usually those that have been used for strenuous work, can occur even some hours after exercise has been discontinued. The cramps are often partly caused by the drinking of large amounts of water during strenuous exercise, without adequate intake of salt.

Treatment

1. Stretch the affected muscles during cramps.
2. Increase intake of salt and fluids.

Heat syncope or faintness

It is caused by reduced flow of blood to the brain in a person who is not acclimatised to high environmental temperatures. The patient feels nauseous, dizzy and can lose consciousness, for a short period.

Treatment

1. A person who is feeling faint should sit or lie down, preferably in the shade.
2. Give fluids containing a small amount of salt.
3. Avoid strenuous exercise for the remainder of the day.

Heat exhaustion

This is the most common of the more serious heat-related illnesses. Generally it is caused by prolonged exertion in a hot environment, resulting in the loss of large amounts of water through perspiration.

Symptoms

- Intense thirst, dizziness, fatigue, agitation and muscle incoordination.
- In severe cases eyes look sunken, mouth and tongue are dry and the patient can even lose consciousness.
- His temperature may be slightly elevated.

Treatment

1. Place the person in the shade.
2. Take off some of his clothes.
3. Cool the patient down with wet clothes or immersion in water (do not use very cold water).

4. Keep air moving around the patient.
5. Encourage him to drink water with salt and/or sugar added (one teaspoon to a litre of water) — as much as he can drink.
6. The patient should not continue exercise or work for the rest of the day, or at least until completely recovered, and then only moderate exercise.

Note: If his temperature continues to rise, evacuate the patient urgently to the nearest hospital for treatment of suspected heatstroke.

Heatstroke

This is the most serious heat injury and has a high mortality rate. It results from a complete breakdown of the sweating and heat regulatory mechanisms. It can occur in young, healthy individuals who have been doing uninterrupted work in a hot environment and sometimes in older individuals in these conditions, even if they have done little strenuous work.

Symptoms

The onset is rapid.

- Confusion, irrational behaviour, incoordination, delirium, convulsions and unconsciousness.
- Rectal temperature almost always above 40°C and even as high as 44°C.
- The patient may be covered with sweat; later, fluid depletion may lead to a hot dry skin and absence of sweating.

This is a true medical emergency and all untreated cases are inevitably fatal. Possible complications are numerous, including brain, liver and kidney damage.

Treatment

Treatment must begin immediately: the aim is to cool the body as rapidly as possible.

1. Ensure an open airway if the patient is unconscious.
2. Elevate his legs if the patient is in shock.
3. Remove his clothes and spray him with a fine spray or droplets of cool water. Fan him vigorously with a shirt or towel to promote evaporation.
4. Rub his arms and legs gently to improve circulation and encourage heat loss through convection.
5. Stop cooling when the patient's temperature has fallen to 39°C; be ready to resume cooling if high fever recurs.
6. Evacuate the patient to the nearest hospital as soon as possible..
7. A qualified person may set up a slow intravenous infusion and, if convulsions occur, Valium 10 mg may be administered slowly intravenously.

Sunburn

This common condition can usually be prevented by using adequate protection against the rays of the sun. People with blonde or red hair have to be particularly careful, while children are more susceptible to sunburn than adults.

At high altitudes there is less filtering of sunlight by the earth's atmosphere: ultraviolet exposure at

altitude is much greater than at sea level.

Glaciers and snowfields can reflect as much as 75 per cent of the incident ultraviolet radiation, exposing climbers to reflected as well as direct rays of the sun.

On overcast days total ultraviolet radiation may be greater than on cloudless days, owing to atmospheric scattering, or 'sky radiation'.

Prevention

- Wear a hat and protective clothing.
- Use a sunscreen lotion with a high sun protection factor.

Symptoms

Depend on skin type and amount of exposure.

- Skin is red and painful and may be swollen.
- Prolonged exposure to the sun results in pain and blistering.
- Symptoms of a severe case are headache, chill, fever.

Treatment

1. Apply cold, wet dressings soaked in boric acid solution (1 teaspoon in a litre of water).
2. Cool soothing creams may relieve discomfort.
3. Panado can be given for headache.
4. If the tissues are very swollen or blistered, treat as for second-degree burns.
5. Stay out of the sun until skin has healed.

Snowblindness

This condition can be described as 'sunburn' of the surface of the eye (which absorbs ultraviolet just as the skin). It is caused by exposing the unprotected eyes to sunlight (particularly when reflected by snow) and other sources of ultraviolet light, such as UV lamps or welding equipment.

Prevention

- Wear good quality sun glasses or goggles.
- Goggles are safer under severe radiation conditions, as they protect the eyes against reflected light from the side. In an emergency the eyes can be protected with cardboard disks into which small slits have been cut.

Symptoms

Symptoms often develop only eight to twelve hours after exposure.

- Initially the eyes feel dry and irritated, this develops into severe irritation and pain.
- Eyelids may become red and swollen, and the eyes tear excessively.
- A severe case may completely incapacitate a person for some days.

Treatment

1. The condition usually heals spontaneously in a few days.
2. Relieve the pain with cold compresses and a dark environment
3. Apply eye lotion or ointment containing steroids early and frequently (hourly).
4. Do not rub the eyes or use local anaesthetic.

High altitude effects

- Acute mountain sickness
- High altitude pulmonary oedema
- High altitude cerebral oedema

Medical problems associated with high altitude range from slight discomfort to life-threatening conditions. They are the result mainly of the decreased concentration of oxygen in the blood which is due to the lower atmospheric pressure at high altitude.

High altitude is regarded as the region between 2 400 m and 4 300 m above sea level. Most cases of altitude sickness occur at altitudes within this range.

Between 4 300 m and 5 500 m above sea level is regarded as very high altitude — rapid ascent to these altitudes without proper acclimatisation will invariably result in altitude sickness.

Usually only very well acclimatised and experienced climbers will reach extreme altitude (5 500 m to 8 000 m): the problems experienced at these altitudes relate mostly to high-altitude deterioration of the body's physical condition.

Acute mountain sickness

This term is used to describe a group of unpleasant symptoms encountered at high altitude. The symptoms depend on the elevation attained, the rate of ascent, and individual susceptibility to the effects of altitude.

Symptoms

Symptoms usually start within 12 to 24 hours. They include:

- Shortness of breath.
- Headache.
- Dizziness.
- Loss of appetite
- Nausea and vomiting.
- Disturbed sleep and tiredness.
- General feeling of being unwell.
- Acute altitude sickness can develop into a cerebral and a pulmonary form (discussed below), which will require the patient to be evacuated to a medical centre.

Treatment

1. Avoid heavy exertion (however, very light outdoor exercise is better than complete rest).
2. Drink a lot of fluids.
3. Eat a light diet high in carbohydrates.
4. Take Aspirin or Panado for headache.
5. Do not take sedatives, especially at night.
6. If a person becomes lethargic or sleepy and his face or extremities are slightly blue he should be kept awake and should be helped to undertake some mild exercise to improve oxygen uptake.
7. Acclimatisation is 80 per cent complete after three days (full acclimatisation takes up to three weeks). Symptoms therefore usually become milder after two to six days at high altitude. If this does not happen, the person may be forced to descend to a lower altitude.

High altitude pulmonary oedema

This is one of the most dangerous diseases associated with high altitude. Fluid leaks from damaged capillaries, filling the lungs and eventually causing death.

Symptoms

- Shortness of breath.
- Chest tightness.
- Headache, nausea, vomiting.
- Coughing. (The patient later coughs up watery or frothy material.)
- Rapid pulse rate.
- An important sign is decreased mental acuity; confusion and delirium are signs of a severe reduction in the amount of oxygen delivered to the brain and are symptomatic of severe illness.

Treatment

1. Look out for early symptoms.
2. Evacuate the patient to a lower altitude immediately if his condition is serious and administer oxygen, if available. A patient who is, or has been, suffering from this condition should always be medically examined.

High altitude cerebral oedema

This is swelling of the brain tissue, caused by the low atmospheric pressure of oxygen at high altitude.

Symptoms

- Headache — severe and constant.
- Incoordination and inability to maintain balance.
- Mental dysfunction, including confusion, loss of memory and inability to exercise proper

judgement.

- The patient ultimately lapses into a coma and dies.

Treatment

1. Check party members for signs of mental dysfunction.
2. If cerebral oedema is suspected, take the patient to a lower altitude as soon as possible and give oxygen, if available.

High altitude diseases often start insidiously and may be difficult to diagnose. Even experienced and very fit climbers can be affected. People who have experienced acclimatisation problems in the past will tend to have difficulties each time they climb to high altitudes.

Joint and muscle injuries

- Torn muscle
- Sprains and dislocations

The standard treatment for most muscle and joint injuries can be remembered by using the acronym 'ICER':

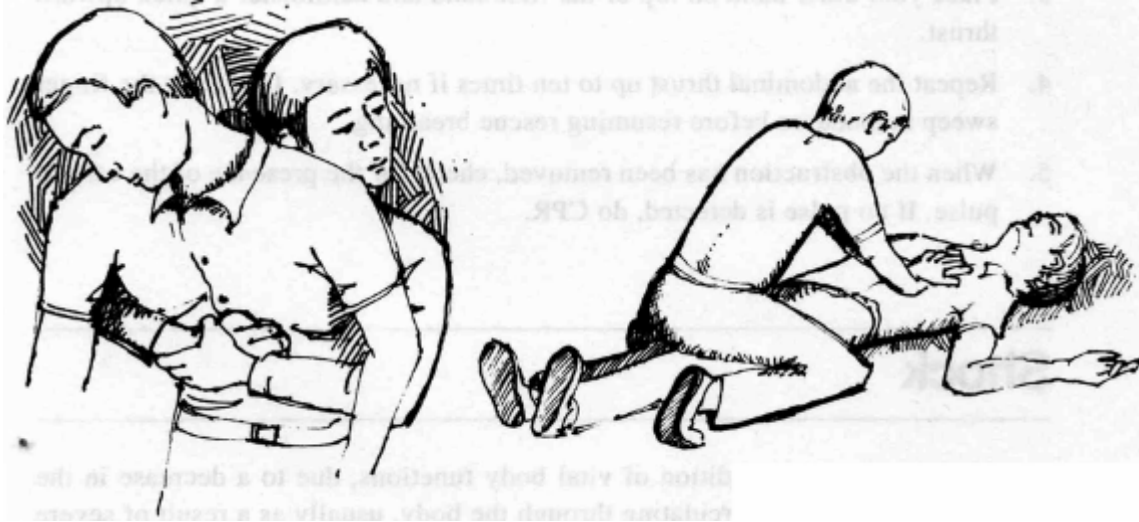
- **Ice.** Apply ice, cold compresses, a cloth dipped into cold mountain water, or a plastic bag containing cold river water to the injured joint as soon as possible to lessen and prevent swelling.
- **Compress.** Apply a supportive bandage around the joint (not too tightly).
- **Elevate.** Allow the injured limb to rest in a slightly elevated position to lessen and prevent swelling.
- **Rest.** If at all possible, do not use the injured joint at all. If it must be used, support it with a firm bandage. In the case of an ankle injury, for instance, you can use a walking stick to support your body weight while walking. Pain is a good indication that the injured joint or muscle is being overstressed.

Obstructed airway, caused by foreign body

A partial obstruction of the airway by a foreign body such as food, sweets, buttons, broken dentures, etc. can often be cleared by repeated, vigorous coughing. If this fails to provide relief, the procedure known as the Heimlich manoeuvre can be used on a conscious patient to dislodge the foreign body.

Symptoms

- In case of a completely obstructed airway the victim cannot speak, cough or breathe and will probably grab his throat with his fingers and thumb. He will lose consciousness and die if the obstruction is not rapidly removed.



Conscious patient

Unconscious patient

Treatment — Heimlich manoeuvre: conscious patient

1. Confirm that the victim is unable to speak, cough or breathe.
2. Let the victim sit or stand.
3. Stand behind the victim and place your arm around his waist.
4. Form a fist with the one hand, so that the thumb comes to rest on his abdomen, on the midline, just above the navel.
5. Grab your fist with the other hand and perform a sudden inward and upward thrust.
6. Repeat the abdominal thrust up to ten times, if necessary, or until the victim becomes unconscious.

Treatment — Heimlich manoeuvre: unconscious patient

If the victim is unconscious the chest wall will fail to rise if an attempt is made to apply rescue breathing. In that case, hook your index finger behind the obstruction and remove it. If you are unable to do so:

1. Kneel astride the victim's thighs.
2. Place the heel of one hand just above the navel, on the midline.
3. Place your other hand on top of the first hand and administer a quick upward thrust.
4. Repeat the abdominal thrust up to ten times if necessary. Carry out the finger sweep manoeuvre before resuming rescue breathing.
5. When the obstruction has been removed, check for the presence of the carotid pulse. If no pulse is detected, do CPR.

Shock

Shock is a depressed condition of vital body functions, due to a decrease in the effective blood volume circulating through the body, usually as a result of severe bleeding. It can be caused by fractures, internal or external loss of body fluids (plasma, blood, perspiration), and any other major injury. The word 'shock', as used in a medical context, should be clearly distinguished from the popular use of the word to describe a sensation of extreme horror, disgust or surprise.

Treatment

1. Position:

The victim must lie down. Raise his feet (except in the case of a head injury, breathing difficulties, or an unsplinted fracture of a lower extremity).

Find and treat the cause of any bleeding. If the patient is unconscious and vomits, turn his head sideways. However, do not turn his head if a neck injury is suspected; instead, use your fingers to clear the vomit from his throat.

2. Maintain body heat:

Use blankets, sleeping bags, space blankets, etc. to insulate the patient from the ground (see the section on neck and back injuries for instructions on how to move a patient with a suspected neck or back fracture).

3. Keep the patient dry:

Remove all wet clothing. Move the patient to shelter or erect an improvised shelter over him (always take the nature of the patient's injuries into account when considering various options).

4. Supply external heat:

Taking care not to inflict burn wounds, use hot-water bottles, heated stones, another person's body heat and hot fluids (the latter only if the patient is fully conscious and not vomiting) to warm the patient gently.

5. If a competent person and the necessary equipment are available, a drip can be put up.

Snake, insect and other animal bites and stings

- Snakebite
- Spiders
- Scorpions
- Insects
- Sea life

Snakebite

Not many of the snakes found in South Africa are dangerous. The few that are can be classified according to the type of venom they possess and the symptoms caused (see also the section on snakes in Chapter 8, Mountain Hazards).

Prevention

- Wear protective clothing in the veld, e.g. ankle-boots.
- Look where you put your hands and feet, especially when climbing over rocks or logs or when using your hands to assist you up a steep slope.
- Never pick up a 'dead snake' — snakes are very good actors.

General principles of treatment

1. Calm the patient down and let him lie down.
2. Determine whether the patient has in fact been bitten; look for fang marks. Beware of psychosomatic symptoms from a non-poisonous snake.
3. Try to identify the snake group according to the symptoms and signs manifested.
4. Never use a tourniquet.
5. Keep a log of symptoms, treatment, times, etc., to aid doctors later.
6. Send immediately for a doctor and for help with evacuation.

a) Wound

1. Do not cut, cauterise or freeze the wound.
2. Sucking will probably not remove any venom. A suction device is therefore also not recommended.
3. Excess venom can be wiped away.
4. Cover the bite wound with a sterile dressing.
5. Cover the whole limb with a crepe bandage. Wind it firmly around the limb from below the bite to where the limb joins the body. This will reduce the absorption of poison through the lymphatic system. The bandage must never be tight enough to endanger the circulation. Leave the toes or fingers open to allow circulation to be checked regularly.
6. Immobilise and support the entire limb, using a splint and supporting bandages or slings.

This method can be used for any snake bite, unless the limb is very swollen.

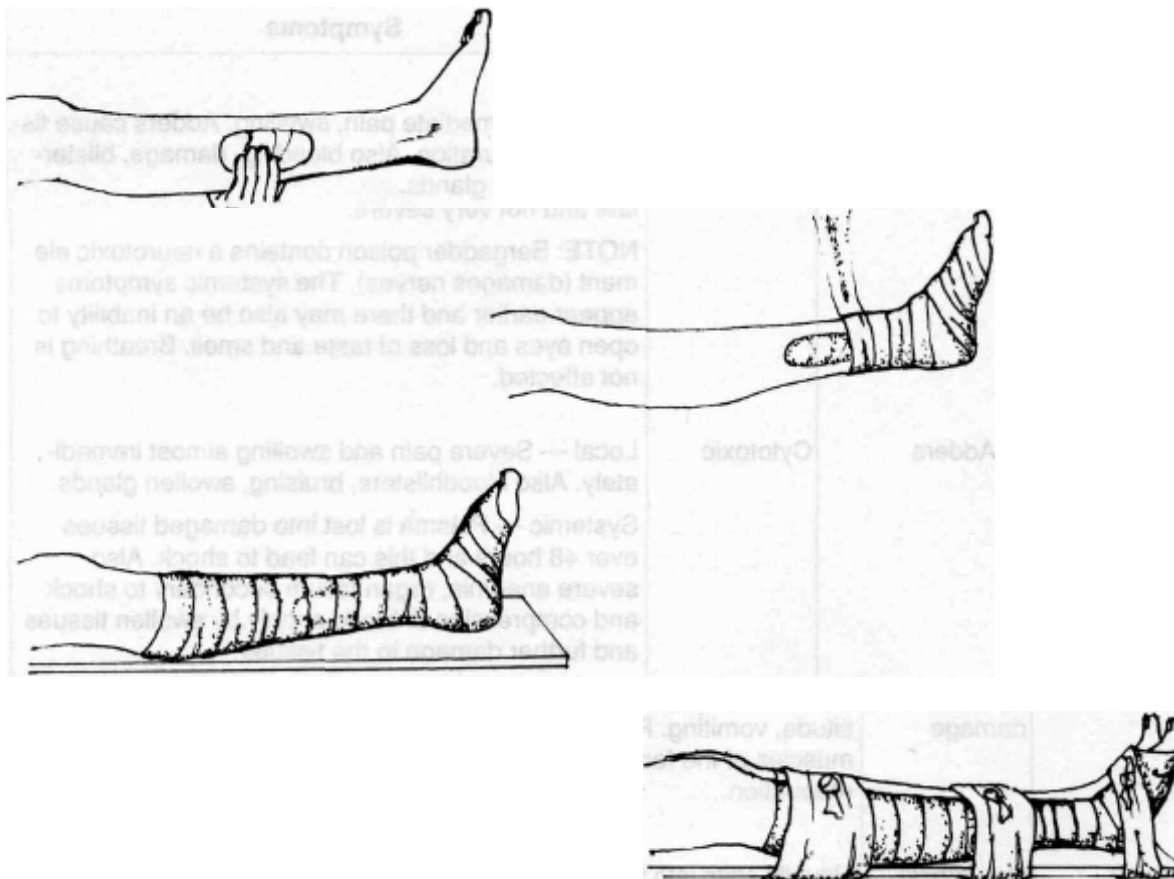
b) Snake venom in the eyes

Rinse with clean water for some ten minutes.

Antiserum

Antiserum (antivenin) is only used to treat bites by mambas, cobras, puffadders, gaboon adders and the rinkhals (please note: it is not effective against bird snake, tree snake or berg adder bites). Antiserum should not be given unless absolutely necessary.

The person administering it should be competent to deal with the allergic reaction which may follow on the injection of polyvalent antiserum. This implies that injectable anti-allergy medication (e.g. Phenergan), adrenalin, and cortisone or hydrocortisone must be carried with the vials of antiserum. Babies and children need the same dose as adults. Never use old, outdated antidote which may have been exposed to heat.



Treatment of a snakebite wound

Snake Type	Venom	Symptoms
<i>Viperidae</i>		
Small Adders	Cytotoxic	<p>Local — Immediate pain, swelling, Adders cause tissue discolouration. Also bleeding, damage, blistering, swollen glands.</p> <p>Systemic — Malaise, nausea, headache. Usually late and not very severe.</p> <p>NOTE: Bergadder poison contains a neurotoxic element (damages nerves). The systemic symptoms appear earlier and there may also be an inability to open eyes and loss of taste and smell. Breathing is not affected.</p>
Adders	Cytotoxic	<p>Local — Severe pain and swelling almost immediately. Also bloodblisters, bruising, swollen glands.</p> <p>Systemic — Plasma is lost into damaged tissues over 48 hours and this can lead to shock. Also severe anaemia, organ failure secondary to shock and compression of blood supply by swollen tissues and further damage to the</p>

		tissues
<i>Elapidae</i>		Neurotoxic — Local — Mild pain and swelling, causes nerve damage. Systemic — Headache, lassitude, vomiting. Progressive weakness of the muscles of the face, eyes, chewing, swallowing and respiration
Cobras	Neurotoxic – causes nerve damage	
Rinkals	Neurotoxic	Usually spits into the eyes. It causes intense pain, swelling of eyes, nerve damage, and temporary blindness. Usually no permanent damage
Black mamba	Neurotoxic	Local — Little reaction. Causes nerve damage. Systemic — Severe reaction within minutes. Includes loss of consciousness, hallucinations, fits, depression of breathing and cardiac system
<i>Colubridae (Back fanged)</i>		Local — Insignificant
Bird Snake	Blood toxin	Systemic — Malaise, headache, vomiting, depression. After 1 to 48 hours — generalised bleeding of the nose, ears, eyes, mouth. Later organ failure
Boomslang		

Administration of antivenin

- Mamba and gaboon adder — give four ampoules immediately into top outside thick part of buttock muscle. More is needed but it must be given intravenously by a doctor.
- Other snakes listed above — two to four ampoules if the hospital cannot be reached within three to four hours.
- Also give antivenin if the crepe-bandage method cannot be used, for example if the bite is not on a limb or if the patient experiences severe systemic symptoms such as breathing difficulty.
- Do not give antivenin for bites of unknown origin, except if the patient displays systemic symptoms.
- Victims of bird snake ('voelslang') and tree snake ('boomslang') bites must be evacuated to a large medical centre for specialised treatment. The polyvalent antivenin is not effective — a special antivenin must be ordered for the victim.
- Do not attempt to administer antivenin unless you have read the enclosed instructions carefully and have been trained to administer it. Incorrectly administered, the antidote can be as deadly as the poison.

A qualified person can also administer the following drugs: anti-histamine (one ampoule into thigh muscle), hydrocortisone (200 mg) intramuscular or intravenous, adrenalin (0,5 ml-1 ml of a 1 in 1 000 solution subcutaneously).

Other important points

Keep the airway open.

If necessary, apply mouth-to-mouth respiration or CPR, as required, until the hospital is reached. If no antivenin is available this will have to be done in any case if the patient's condition requires it.

The patient may not be left alone until he reaches the hospital.

It is a good idea to carry in your rucksack one of the excellent field guides on the types of poisonous snakes found in South Africa.

Spiders

Species	Examples	Symptoms	Treatment
<i>Latrodectus indistinctus</i>	Black widow, button spider	Pain soon after bite. Muscle cramps. Death rare; only Black widow victims.	Spider antiserum for severe symptoms; anti-histamine tablets.
<i>Latrodectus geometricus</i>	Brown spider, gutter spider	Pain soon after bite. Muscle cramps.	Spider antiserum for severe symptoms; anti-histamine tablets.
<i>Loxosceles spinulosa</i>	Fiddle back and violin spider	Bite usually unnoticed; days later, big wound with poor healing.	No emergency treatment.

Scorpions

Types

- Scorpionidae — large pincers, slender tail: mild toxin.
- Buthidae — small pincers, large tail: severe toxin.

The venom is transferred by stinging or squirting.

Symptoms

- Local symptoms: severe burning pain, swelling and redness.
- Systemic symptoms: muscle cramps, convulsions, respiratory failure. Can be fatal in children.

Treatment

1. Local anaesthetic for pain, or morphine derivatives.
2. Apply ice as soon as possible.
3. If venom is in eyes, wash out with water.
4. The patient may need specific antivenin for severe systemic symptoms.

Insects

Stings of bees and wasps may be fatal if a person is allergic to them. People who suffer from such allergies should always carry their own medication. (Adrenalin 0,5 ml can be given subcutaneously by a doctor in cases of severe reaction; also anti-histamine and cortisone.)

For bee stings generally: remove the stinger carefully with the flat side of a knife blade, taking care not to squeeze the attached poison sack. Treat for pain and give anti-histamine tablets.

Sea life

Injuries caused by the so-called jelly fish (blue bottle, Portuguese man of war) are fairly common along our shores.

Treatment

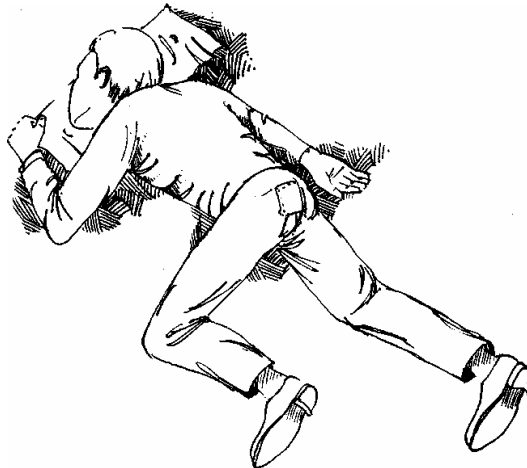
1. Immerse limb in hot sea water or apply ammonia, vinegar or meat tenderiser.
2. Remove tentacles with a gloved hand.
3. Apply steroid cream.

Unconsciousness

Unconsciousness is a condition characterised by the complete or partial loss of sensory awareness and the ability to react to stimuli. The most important causes of unconsciousness are:

- Obstruction of the airways, caused by foreign objects, swelling of tissues, pressure, or drowning.
- Defective breathing mechanism, caused by muscle paralysis, electric shock or lightning, poisoning, or excessive heat or cold.

Unconscious patients often require CPR. However, a patient can be unconscious and still be breathing, for instance in the event of poisoning (e.g. by alcohol or gases), head injuries, shock, acute pain, and certain medical conditions such as diabetes, heart attack, apoplexy, meningitis, heat stroke and extreme emotional distress (anxiety, hysteria).



Treatment

Always consider a patient who is or who has been unconscious to be in a serious condition and evacuate him as soon as possible. Even if he comes to spontaneously he should still be taken to a hospital for a check-up.

1. The best position for an unconscious patient without a neck injury is on his side or almost on his stomach, with one leg bent to support the body and the head supported on the extended arm (except when CPR is being applied).
2. Establish an open airway, remove any foreign object from the throat and mouth and hold the patient's head tilted back and his jaw lifted to keep the airway open.
3. Find out if the patient's heart is beating by feeling for the pulse in the neck — if not, start CPR. If the heart is beating but the patient is not breathing even after the opening of the airway, give mouth-to-mouth breathing.
4. Follow all other principles of first aid: stop bleeding, splint fractures, prevent and treat shock,

and organise the evacuation. Do not try to give an unconscious patient anything by mouth.

A patient who loses consciousness for a short time, comes to, and then begins to lose consciousness again, is in a very serious condition and must be evacuated as soon as possible.

Wounds and soft tissue injuries

- Major wounds (and bleeding)
- Superficial wounds
- Other wounds

A wound is an injury to the skin, with or without an injury to the underlying tissues. The most serious complications associated with wounds are loss of blood, shock (as a result of pain and loss of blood), and infection.

Major wounds

Treatment

1. Control the bleeding.

Arterial bleeding causes bright red blood to spurt from the wound, while venous bleeding causes a slower loss of dark red (deoxygenated) blood. The only effective way to stop staunch bleeding is to apply direct pressure to the site of the wound. Use a sterile or at least clean swab, cloth or bandage for at least four to six minutes. Occasionally it is necessary to bandage the compress tightly over the wound to stop arterial bleeding. Make sure that the circulation to the rest of the limb is not endangered and remove this tight bandage when the bleeding has stopped. Do not use a tourniquet. If the wound is on a limb, elevate the limb.

2. Prevent infection.

It is important to take steps to prevent infection, particularly if the patient cannot be evacuated immediately. To disinfect a deep, extensive wound, proceed as follows: Wash your hands with soap or disinfectant lotion. Pour diluted disinfectant onto a swab and cleanse the surrounding skin only. The wound itself can be gently rinsed with diluted disinfectant. Place a clean or sterile wound dressing on the wound and keep it in place with a bandage or adhesive plaster.

3. Immobilise the injured limb.

Keep it elevated higher than the heart in case of bleeding.

4. Evacuate.

Get the patient to a doctor.

Superficial wounds

Treatment

1. Wash your hands with soap or disinfectant lotion. Clean the area around the wound with diluted disinfectant, washing away from the wound. Pour diluted disinfectant onto a swab and rinse, rather than scrub, the wound, using diluted disinfectant and movements radiating from the centre outwards. Small pieces of debris can be removed, but do not attempt to remove large

woodsplinters, etc, since this can cause further tissue damage and bleeding. If you have proper swabs, use a clean swab for each movement. Dry the wound using a clean swab.

2. Apply antiseptic such as Betadine Cream and sprinkle with antibiotic powder, e.g. Cicatrin, or spray with an aerosol such as Neomycin or Surgispray.
3. If necessary, cover the wound with a thick sterile dressing, kept in place with adhesive plaster or tape.

Other wounds

Abdominal wounds

If a serious wound of the abdomen is accompanied by organs protruding from the wound, never try to push the organs back into the abdomen. Keep the patient on his back; lift his head and shoulders and draw his knees up. Use sufficient emergency dressings to cover protruding organs and keep moist with saline solution (one teaspoon salt in one litre of boiled water, cooled down). Keep throat and airway clear of vomitus. Hospitalise as soon as possible.

Penetrating chest wounds

Place the palm of the hand over the wound immediately. Quickly slide a piece of plastic over the wound, and secure the edges with adhesive plaster. Use some bandaging material to make a firm pressure pad to place over the plastic and secure it in place with overlapping horizontal strips of plaster. Maintain an open airway. Hospitalise as soon as possible.

General treatment of internal bleeding

Both abdominal wounds and penetrating chest wounds are usually accompanied by internal bleeding. Since it is not possible to staunch the bleeding, rapid hospitalisation followed by transfusions and surgery are often the only life-saving treatment.

1. Place the patient in the position required by the nature of the injury (Lung injury: head and shoulders raised; if it is known where the bleeding is, turn the patient to that side. Abdominal injury: half sitting).
2. Keep patient calm and still. Treat for shock.
3. Wipe the mouth with a wet cloth.
4. Maintain body temperature.
5. Give no fluids or stimulants by mouth.

Other medical conditions

- Abdominal conditions
- Neurological
- Respiratory
- Minor ailments

No person should go on a hiking trip if he is suffering from an illness which may deteriorate later and endanger the safety and enjoyment of the other members of the party.

It is always difficult to decide whether a patient needs medical attention. Generally speaking, any severe symptoms that persist for more than six hours and that do not respond to treatment could be indicative of a serious condition, and plans should be made for the patient to receive proper medical care.

Abdominal conditions

Abdominal pain

Many causes. Severe colicky pain, especially if accompanied by distended abdomen and vomiting, may be cause for concern. Appendicitis pain is usually felt in the right, lower abdomen. Any pain that incapacitates the patient must be considered serious.

Diarrhoea

This is a common condition which usually responds well to adequate intake of fluids and anti-diarrhoea tablets. Occasionally a patient may become very ill and dehydrated and require hospital treatment.

Vomiting

As for diarrhoea, but be careful if it is accompanied by a distended abdomen and no passing of stool. Vomiting of reasonable amounts of blood is also cause for concern.

Neurological

Headache is the most common complaint. As indicated in the section on minor ailments there are various causes, usually of a non-serious nature. Care should be taken if the headache is very severe and is accompanied by vomiting, convulsions or loss of consciousness. Bear in mind the possibility of high altitude cerebral oedema.

Respiratory

Infrequently, a previously healthy person may get pneumonia. The patient has fever, chills, and chest pain and he coughs up sputum. He should be evacuated. Bear in mind the possibility of high altitude pulmonary oedema. Other causes of chest pain include a heart attack and severe heartburn.

Infectious diseases

If you are not absolutely certain that your source of water is safe, boil the water or add the correct tablets or iodine before use.

In southern Africa malaria is an ever-present danger. Find out if the area you intend to visit is a malarial area and take the preventive medication correctly and timeously. Also use insect repellants.

Tick-bite fever is fairly common in summer. Look out for ticks on your skin. If you should become ill after a visit to the veld, mention it to your doctor; the same applies after a visit to a malarial area.

Minor ailments

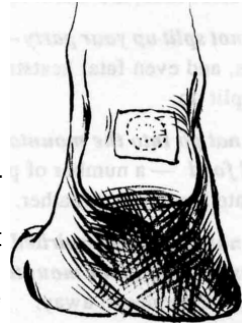
Headache

This is a very common complaint. Apart from the more serious causes already discussed, a headache can also be caused by inadequate sunglasses, neck muscle tension, constipation, colds and flu, etc. Relieve pain with Aspirin or Panado. Try to determine the cause and treat accordingly.

Blisters

(The prevention of blisters is discussed in Chapter 4, Hiking Skills). Blisters are the most common hiking ailment. Treat the problem at the first sign of discomfort by smearing the area with an antiseptic cream and covering it with a broad plaster. Self-adhesive chirobody felt or moleskin can also be used.

If a blister has already formed, cut a hole the size of the blister in a piece of moleskin or plaster in order to elevate the area around the blister. Place a second piece of plaster over the ring plaster. If it becomes necessary to prick a large blister, first wash the feet. Then, sterilise a needle (a lighter or match can be used) and prick the blister. Express the fluid and cover the area with a sterile dressing which should be changed daily.



Nose bleeds

A common, usually non-serious complaint, caused by heat, minor trauma, etc. Clamp the nose firmly just below the bony part and keep up the pressure for at least five minutes. Cold compresses may help.

Fainting

Fainting is caused by a temporary reduction in the supply of blood to the brain. A person can faint after standing for long periods, for example, or when rising suddenly after resting. The person usually recovers quickly after lying down; if not, a more serious cause should be suspected. A person who is feeling faint should sit or lie down — the feet may be elevated slightly.

Sunburn

See the section on heat-related disorders.

A final note

Prevention is better than cure. Most of the injuries and emergencies dealt with in this chapter can be prevented, particularly if leaders of groups going into the mountains exercise proper control over their party and instill in every member a cautious respect for the outdoor environment.

The following common-sense guidelines, most of which have already been mentioned elsewhere, are worth repeating:

- Do not split up your party — a number of fatal cases of hypothermia, drowning, falls, and even fatal heatstroke have taken place because a group was allowed to split up.
- Do not go into the mountains unless you are carrying the correct equipment and food — a number of people would be alive today if they had not underestimated mountain weather.
- Do not allow high-spirited youngsters to indulge in solo exploits or to behave irresponsibly in the mountains — they are not at home, where medical attention is just a phonecall away.
- Do not take unnecessary chances — diving into a mountain pool of which you do not know the depth, climbing up the side of a cliff just for the fun of it: these actions can easily result in fatal accidents or serious injuries involving internal bleeding, fractures, or open wounds.
- Do not expect to be able to apply successfully the techniques suggested in this chapter, without having practised them in a first-aid course.

APPENDIX — Suggested contents of first-aid kit

General first-aid kit:

- Antiseptic cleaning lotion e.g. Savlon, Betadine
- Sterile gauze wound dressings.
- Crepe and gauze bandages.
- Cottonwool or gauze swabs for cleaning.
- Paraffin gauze.
- Antiseptic cream, such as Betadine cream.
- Pain tablets, e.g. Codis, Panado.
- Anti-diarrhoea treatment, e.g. Lomotil.
- Cold and flu remedy.
- Antihistaminic cream and tablets.
- Eye drops, e.g. Covomycin.
- Sterile needle to open blisters, remove thorns, etc.
- Tweezers.
- Elastoplast with and without gauze strip.
- Safety pins.
- Small, sharp scissors.
- Motion sickness and nausea treatment e.g. Valoid tablets.
- Antacids.
- Lotions to prevent and relieve sunburn.
- Pencil and paper for emergency messages and for keeping a record of symptoms and treatment.

Notes

The above list is only a guideline. Before each trip the person responsible for first aid should check the first-aid equipment, replace expired or partly used items, and add whatever extra items are considered necessary for the trip. This person should also familiarise himself with the uses and dosages of the items in the first-aid kit. A small notebook containing a checklist and medication information is also valuable.

The quantity or number taken of the various items listed will depend on the size of the party and the length of the trip.

All members of the party should carry their own personal medication for conditions such as asthma, epilepsy, diabetes and for bee stings and other allergies. They should inform the leader if they suffer from such a medical condition.

A first-aid kit should be light and compact and packed in a sturdy, watertight container or satchel.