prep kit

Ready for Review

- Burns occur in every age group; across all socioeconomic levels; at home and in the workplace; and in urban, suburban, and rural settings.
- Burn injuries can be classified as thermal, chemical, or electrical.
- Treatment depends on the depth of burns.
- A chemical burn is the result of a caustic or corrosive substance touching the skin.
- There are three types of electrical injuries: thermal burn (flame), arc burn (flash), and true electrical injury (contact).

Vital Vocabulary

chemical burns Damage caused to the skin by chemicals.

electrical burns Injury caused from contact with electric current.

first-degree (superficial) burns Burns affecting only the epidermis. Characterized by skin that is red but not blistered or burned through.

second-degree (partial-thickness) burns Burns affecting the epidermis and some portion of the dermis but not the subcutaneous tissue. Characterized by blisters and skin that is white to red and moist.

thermal (heat) burns Damage to the skin caused by contact with hot objects, flammable vapor, steam, hot liquid, or flames.

third-degree (full-thickness) burns Burns that affect all skin layers and may affect the subcutaneous layers, muscle, bone, and internal organs, leaving the area dry, leathery, and white, dark brown, or charred.

Assessment in Action

After a long, hot day at the water park, your friend complains of severe sunburn on his back and shoulders. He failed to apply sunscreen while at the water park. Blisters have formed, and your friend refuses to sit up in a chair and complains of severe pain.

Directions: Circle Yes if you agree with the statement; circle No if you disagree.

Yes No **1.** The blisters and pain are signs that this is a first-degree burn.

Yes No **2.** You should break the blisters to relieve pressure and clean the burn.

Yes No **3.** Cool compresses can be used to relieve pain.

Yes No **4.** You can apply antibiotic ointment and aloe vera to keep the skin moist.

Yes No **5.** This person does not need medical care.

Check Your Knowledge

Directions: Circle Yes if you agree with the statement; circle No if you disagree.

Yes No **1.** Victims of a burn should immediately drink water.

Yes No **2.** Petroleum jelly can be applied over a burn.

Yes No **3.** The rule of the hand can help determine the size of a burned area.

Yes No **4.** Neutralize an acid on the skin by using baking soda.

Yes No **5.** Use a large amount of water to flush chemicals off the body.

Yes No **6.** Brush a dry chemical off the skin before flushing with water.

Yes No **7.** When someone gets electrocuted, there can be two burn wounds: entrance and exit.

Yes No **8.** When a victim is in contact with a power line, use a tree branch to remove the wires.

Yes No **9.** Ibuprofen helps relieve pain and swelling.

Yes No **10.** Cold water can be used, in moderation, on any burn of any size.

Head and Spinal Injuries

10

chapter at a glance

Head Injuries

Any head injury is potentially serious. If not properly treated, injuries that seem minor could become life threatening. Head injuries include scalp wounds, skull fractures, and brain injuries. Spinal injuries (that is, neck and back injuries) can also be present in head-injured victims.

Scalp Wounds

Scalp wounds bleed profusely because the scalp has many blood vessels. A bleeding scalp wound does not affect the blood supply to the brain. The brain obtains its blood supply from arteries in the neck, not the scalp. A severe scalp wound may have an accompanying concussion, skull fracture, an impaled object, a brain injury or a spinal injury.

Care for Scalp Wounds

1. Control the bleeding by applying direct pressure with a dry, sterile or clean dressing. If the dressing becomes blood filled, do not remove it. Add another dressing on top of the first one Figure 1.
2. If you suspect a skull fracture, apply pressure around the edges of the wound and over a broad area rather than on the center of the wound Figure 2.

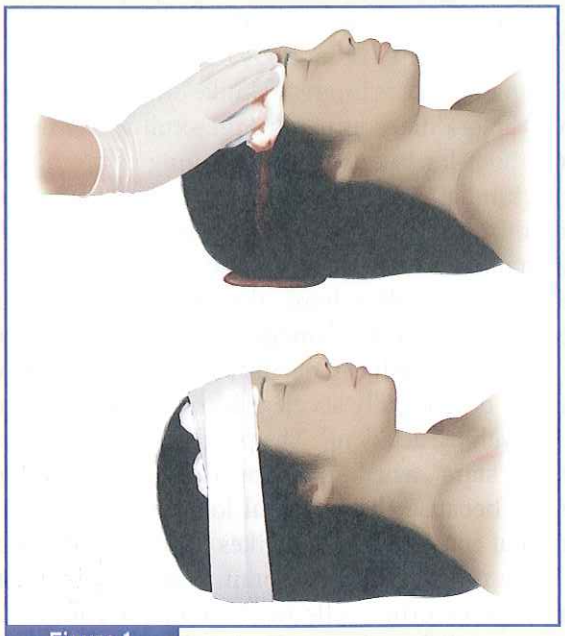


Figure 1

Apply direct pressure with a dry, sterile dressing to control the bleeding.

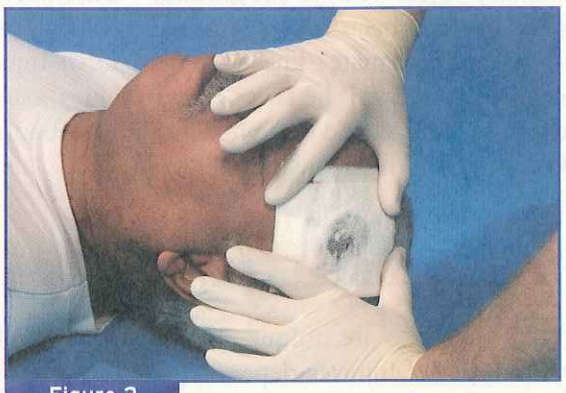


Figure 2

Apply pressure around the edges of the wound to control bleeding from a suspected skull fracture.

3. Keep the head and shoulders slightly elevated to help control the bleeding if no spinal injury is suspected.
4. Seek medical care.

Skull Fracture

A skull fracture is a break or a crack in the cranium (bony case surrounding the brain). Skull fractures may be open (with an accompanying scalp laceration) or closed (without an accompanying scalp laceration).

Figure 3

Raccoon eyes.

Recognizing Skull Fracture

It is difficult to determine a skull fracture except by X-ray or a CT scan unless the skull deformity is severe. Signs and symptoms of a skull fracture include the following:

- Pain at the point of injury
- Deformity of the skull
- Bleeding from the ears or nose
- Clear, pink, watery cerebrospinal fluid (CSF) leaking from an ear or the nose. A drop of CSF on a handkerchief, pillowcase, or other white or light-colored cloth will form a pink ring around a slightly blood-tinged center, resembling a target; this is called the halo sign (ring sign).
- Discoloration around the eyes ("raccoon eyes") appearing several hours after the injury Figure 3.
- Discoloration behind an ear (known as Battle's sign), appearing several hours after the injury Figure 4.
- Heavy scalp bleeding if the skin is broken. A scalp wound may expose the skull or brain tissue.
- Penetrating wound such as from a bullet or an impaled object.

Care for Skull Fracture

1. Monitor the victim's breathing and, if absent, begin CPR.
2. Stabilize the victim's neck to prevent movement.
3. Keep the head and shoulders slightly elevated if no spinal injury is suspected.

Figure 4

Battle's sign.

CAUTION

DO NOT stop the flow of blood or CSF from an ear or nose. Blocking the flow could increase pressure within the skull.

DO NOT remove an impaled object from the head. Stabilize it in place with bulky dressings.

DO NOT clean an open skull fracture; infection of the brain could result.

DO NOT press on the fractured area.

4. Cover the wounds with a sterile dressing.
5. To control bleeding, apply pressure around the edges of the wound, not directly on it.

Brain Injuries

It is not injury specifically to the head that causes most short- and long-term problems, but injuries to the brain itself. Most head injuries are a result of motor vehicle crashes and falls. Many of these injuries are minor—shallow lacerations or localized bruising and swelling. However, about 50,000 people die each year in the United States of head trauma, and twice that many have brain injuries that leave them with permanent damage.

The brain is a delicate organ. When the head is struck with sufficient force, the brain bounces against the inside of the skull. Brain injuries can be serious and difficult first aid emergencies to handle. The victim is often confused or unresponsive, making assessment difficult. Many brain injuries are life threatening. Mishandling a victim with a brain injury could result in permanent damage or death.

The brain, like other body tissues, will swell from bleeding when it is injured. Unlike other tissues, however, the brain is confined in the skull where there is little room for swelling. Any swelling of brain tissue or accumulation of blood inside the skull compresses the brain and increases the pressure inside the skull, which interferes with brain functioning. Furthermore, because the skull is hard, the brain and its surface blood vessels may be damaged if they strike the inside of the skull, which can occur when the head is struck directly or is rapidly accelerated or decelerated (such as in a vehicle accident). The phenomenon of a person "seeing stars" when struck on the back of the head results because the occipital lobe of the brain (the part that controls vision) strikes the back of the skull.

The nerve cells of the brain and the spinal cord, unlike most other cells in the body, are unable to regenerate. When those cells die, they are lost forever and cannot be replaced. Injuries to the brain can be caused by a penetrating foreign object, by bony fragments from a skull fracture, or by the brain striking the inside of the skull after a person's head has hit a stationary object (such as the ground)—a *deceleration* injury—or has been hit by something like a baseball bat or a teammate's knee—an *acceleration* injury. Sometimes there will be two points of injury: one at the point of impact and one where the brain rebounds off the skull on the opposite side.

Types of Brain Injury

All brain injuries are unique. The brain can receive several types of injuries depending on the type and amount of force that impacts the head. The type of injury the brain receives may affect just one functional area of the brain, various areas, or even the entire brain. Two types of brain injury are traumatic brain injury and acquired brain injury.

Traumatic Brain Injury

The following sections on traumatic brain injury are adapted from Centers for Disease Control and Prevention, National Injury and Violence Prevention.

Concussion

A concussion is considered a mild traumatic brain injury (MTBI) and occurs when a blow to the head alters the function of the brain Table 1.

Table 1 Symptoms of MTBI

Thinking/Remembering

- Difficulty thinking clearly
- Feeling slowed down
- Difficulty concentrating
- Difficulty remembering new information

Physical

- Headache
- Nausea or vomiting (early on)
- Balance problems
- Dizziness
- Fuzzy or blurry vision
- Feeling tired, having no energy
- Sensitivity to noise or light

Emotional/Mood

- Irritability
- Sadness
- More emotional
- Nervousness or anxiety

Sleep Disturbance

- Sleeping more than usual
- Sleeping less than usual
- Trouble falling asleep

Source: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control

FYI

Suspect a Concussion (MTBI)

- High-speed activities (motor vehicle crashes, bicycle riding, skateboarding)
- Sports and recreation activities
- Falls (including those among older adults), especially from a significant distance (eg, off a ladder, from a tree)
- Suspected child maltreatment (eg, shaking, hitting, throwing)
- Exposure to blasts (including military personnel returning from war zones)
- Injuries to the external parts of the head and/or scalp (eg, lacerations) and orthopaedic injuries (eg, fractures, dislocations)

Source: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. Heads Up: Facts for Physicians about Mild Traumatic Brain Injury (MTBI). (5) (Accessed January 14, 2011: http://www.cdc.gov/concussion/headsup/pdf/Facts_for_Physicians_booklet-a.pdf)

Recovery from a concussion can last anywhere from several minutes to days, weeks, months, or even longer. Children, adolescents, and older adults tend to take longer to recover than adults. Concussion victims who have already experienced previous concussions may need increased recovery time as well. Although most concussion victims make a full recovery, it is possible for victims to experience post-concussion syndrome, in which concussion symptoms last longer than 3 months.

Sometimes additional problems can occur in a concussion victim. A concussion victim experiencing any of the following signs and symptoms may have a blood clot that is pushing the brain against the skull:

- Loss of consciousness, even if brief
- Persistent, worsening headache
- Weakness, numbness, or decreased coordination
- Vomiting or nausea
- Slurred speech
- Very drowsy or cannot be awakened
- Increasingly confused, restless, or agitated
- Unusual behavior
- One pupil larger than the other
- Convulsions or seizures
- Inability to recognize people or places
- Will not stop crying and cannot be consoled (child)
- Will not nurse or eat (child)

Victims experiencing any of these signs and symptoms should seek immediate medical care.

If the victim is wearing a helmet, such as a motorcycle or football helmet, it should not be removed by a first aider unless:

- You suspect an obstructed airway.
- The helmet is so loose that you cannot stabilize the spine.

If the helmet must be removed to provide lifesaving care of an airway problem, make sure to stabilize the head and neck as the helmet is carefully removed.

Other Traumatic Brain Injuries

Other types of traumatic brain injuries include the following:

- Contusion: A direct blow to the head can cause a bruise to the brain.
- Coup-contrecoup: A blow to the head is strong enough to cause a contusion at the site of impact, as well as move the brain, causing it to hit the opposite side of the skull. This second hit causes a second contusion.
- Diffuse axonal: Shaking or strong rotation of the head causes this tearing injury. One example of diffuse axonal injury is Shaken Baby Syndrome.
- Penetration: Objects such as a bullet, knife, or other sharp object enters the brain. The wound is then contaminated by hair, skin, bone, and pieces of the penetrating object. These contaminants may not be retrievable.

Acquired Brain Injuries

Acquired brain injuries are injuries that develop during or after birth and are not due to injuries. This is in contrast to congenital problems, which are due to abnormal brain development before birth. Acquired injuries include infection, stroke, tumors, and anoxia (lack of oxygen). Anoxia can be due to conditions such as respiratory arrest, problems during birth, or drowning. Acquired brain injuries can cause signs and symptoms that are similar to traumatic brain injuries. Care is mainly supportive and requires immediate medical attention.

Further Care

Several signs appearing within 48 hours of a head injury indicate a need to seek medical care.

- **Headache**: Expect a headache. If it lasts more than 1 or 2 days or increases in severity, seek medical advice.
- **Nausea, vomiting**: If nausea lasts more than 2 hours, seek medical advice. Vomiting once or twice, especially in children, may be expected after a head injury. Vomiting does not indicate the severity of the injury. However, if vomiting begins again hours after the initial episodes have ceased, seek medical care.
- **Drowsiness**: Allow a victim to sleep, but wake the victim at least every 2 hours to check the state of consciousness and sense of orientation by asking his or her name and to use information-processing skills (for example, "Recite the months of the year backward"). If the victim cannot respond or appears confused or disoriented, seek medical advice.
- **Vision problems**: If the victim "sees double," if the eyes do not move together, or if one pupil appears to be larger than the other, seek medical advice.
- **Mobility**: If the victim cannot use his or her arms or legs as well as previously or is unsteady when walking, seek medical care.
- **Speech**: If the victim has slurred speech or is unable to talk, seek medical care.
- **Seizures (convulsions)**: If the victim has a violent involuntary contraction (spasm) or series of contractions of the skeletal muscles, seek medical care.

Eye Injuries

Of all the parts of the human body, an injured eye probably causes the most anxiety and concern in a victim. The eyes—arguably the most important human sense organs—are easily damaged by trauma. A very slight penetration by a metal fragment, for example, means hospitalization. Medical care may include surgery; despite technical advances, blindness or the loss of an eye remains a possibility whenever there is an eye injury. Have an opthamologist or other physician examine the eye as soon as possible, even if an injury seems minor at first.

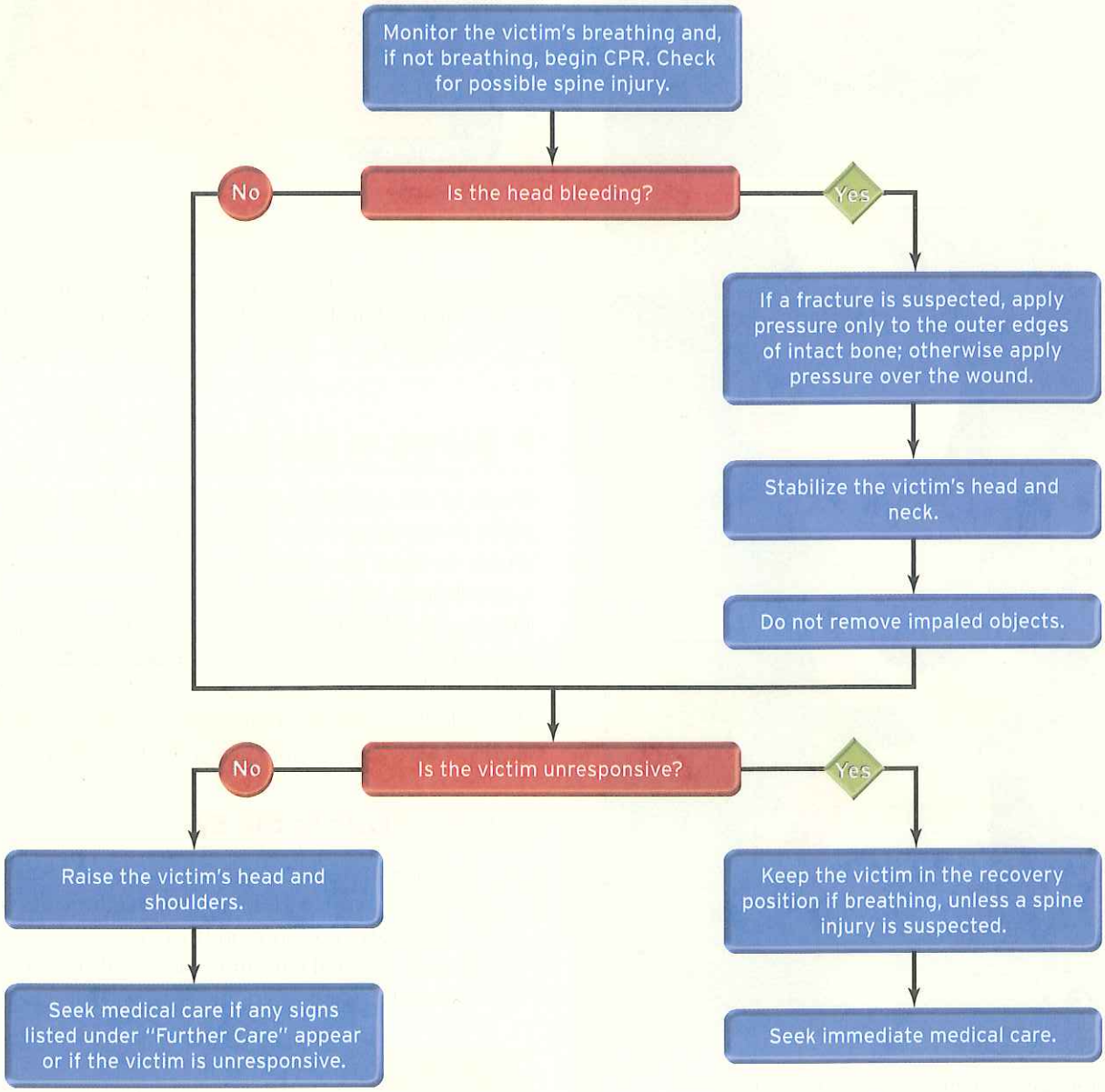
Penetrating Eye Injuries

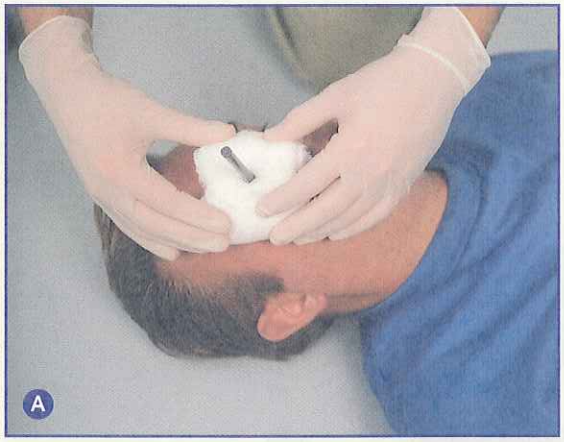
Penetrating eye injuries are severe injuries that result when a sharp object, such as a knife or a needle, penetrates the eye. Most penetrating injuries, although not all, are obvious. Suspect penetration any time you see a lid laceration or cut.

Care for Penetrating Eye Injuries

1. Seek immediate medical care. Any penetrating eye injury should be managed in the hospital.
2. Stabilize the object. Stabilize a long, protruding object with bulky dressings or clean

Head Injuries





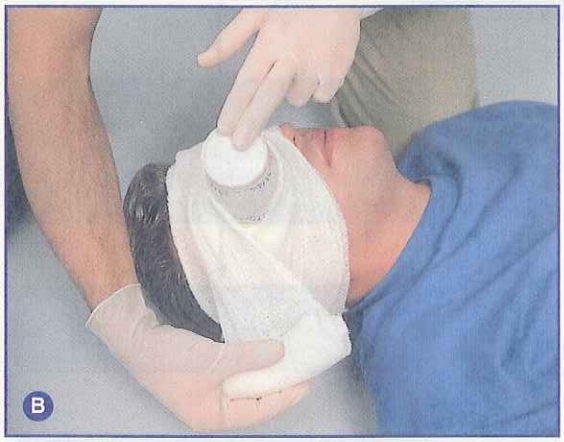


Figure 5

Stabilizing a long, penetrating object against movement (using a paper cup to protect the object from being hit).

cloths. You can place a protective paper cup or cardboard folded into a cone over the affected eye to prevent bumping of the object Figure 5. For short objects, surround the eye without touching the object with roller gauze bandage or cloths held in place with a roller bandage.

Figure 6

Blow to the eye.

Blows to the Eye

Blows to the eye can range in severity from minor to sight threatening. One such injury is the common shiner or black eye, which occurs when some of the many delicate blood vessels around the eye rupture. The bleeding itself is insinuficant and will disappear, but it may hide damage to the eyeball Figure 6. A fist, ball, or other blunt object can break the bone around the eyeball. Symptoms that indicate such a break are double vision and the inability to look upward.

Care for Blows to the Eye

1. Apply an ice or cold pack for about 15 minutes to reduce the pain and swelling. Do not apply any pressure on the eye.
2. Seek medical care immediately if there is double vision, pain, or reduced vision.

CAUTION

DO NOT assume that any eye injury is innocent. When in doubt, seek medical care immediately.

DO NOT remove an object stuck in the eye or try to wash out an object with water.

DO NOT exert pressure on an injured eyeball or a penetrating object.

FYI

Eyes move in the same direction together, focusing on the same object. This is known as sympathetic eye movement. Therefore, when the uninjured eye moves, the injured eye moves as well. This may aggravate an injury.

To lessen movement in an injured eye:

- Tell the victim to keep the uninjured eye closed.
- Cover the undamaged eye with a cravat or roller bandage.

The victim may become anxious if both eyes are covered and he cannot see. Help overcome anxiety by:

- Explaining everything that you are doing.
- Leaving a small peephole at the bottom of the bandage for the uninjured eye to see through. This keeps the victim's eyes still by allowing the eyes to look in only one direction.

Figure 7

Lacerated eyelid.

Figure 8

Flushing the eye to treat a chemical burn.

Cuts of the Eye or Lid

The signs of a cut eyeball or lid include the following Figure 7:

- "Cut" appearance of the cornea (clear part of the eye) or sclera (white part of eye).
- Inner liquid filling of the eye may come out through the wound.
- Lid is cut.

Care for Cuts of the Eye or Lid

1. If the eyeball is cut, do not apply pressure. If only the eyelid is cut, apply a sterile or clean dressing with gentle pressure.
2. Bandage both eyes lightly.
3. Seek medical care immediately.

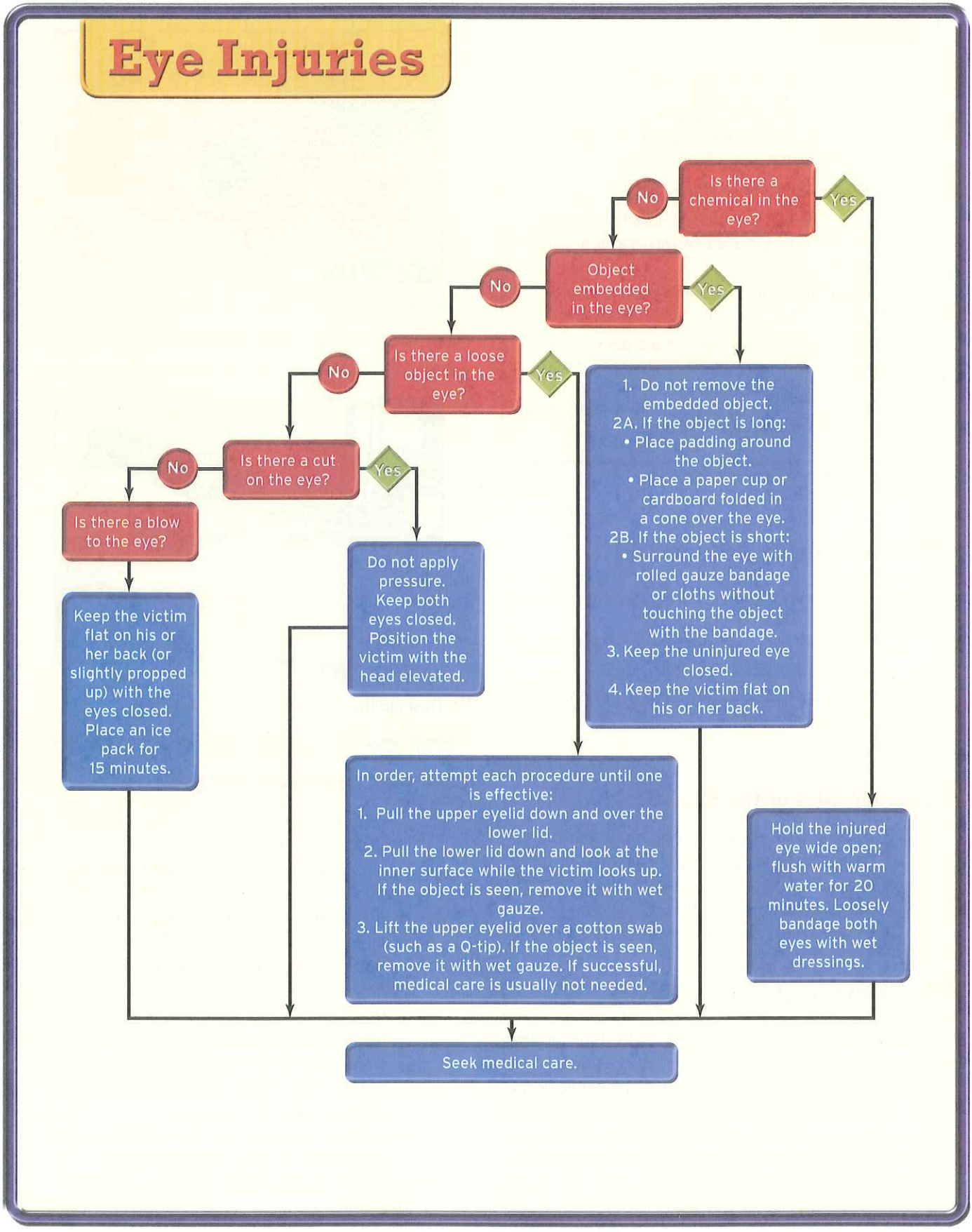
Chemical in the Eyes

Chemicals in the eyes can threaten sight. First aid may determine the fate of the eye and vision. Alkalis cause greater damage than acids because they penetrate deeper and continue to burn longer. Common alkalis include drain cleaners, cleaning agents, ammonia, cement, plaster, and caustic soda. Common acids include hydrochloric acid, nitric acid, sulfuric (battery) acid, and acetic acid. Because damage can occur in 1 to 5 minutes, the chemical must be removed immediately Figure 8.

Care for Chemical in the Eye

1. Use your fingers to keep the eye open as widely as possible.
2. Flush the eye with water immediately. If possible, use warm water. If water is not available, use any nonirritating liquid.
   - Hold the victim's head under a faucet or pour water into the eye from any clean container for at least 20 minutes, continuously and gently. It is impossible to use too much water on these injuries.
   - Irrigate from the nose side of the eye toward the outside to avoid flushing the material into the other eye.
   - Tell the victim to roll the eyeball as much as possible to help wash out the eye.
3. Loosely bandage both eyes with cold, wet dressings.
4. Seek immediate medical care.

Eye Injuries



CAUTION

DO NOT try to neutralize the chemical. Water usually is readily available for eye irrigation.

DO NOT use an eye cup for a chemical burn.

DO NOT bandage the eye tightly.

Eye Avulsion

A blow to the eye can *avulse* it (knock it out) from its socket. This is a serious injury.

Care for Eye Avulsion

1. Cover the eye loosely with a sterile or clean dressing that has been moistened with clean water. Do not try to push the eyeball back into the socket.
2. Protect the injured eye with a paper cup, a piece of cardboard folded into a cone, or a doughnut-shaped pad made from a roller gauze bandage or a cravat bandage.
3. Cover the undamaged eye with a patch to stop movement of the damaged eye.
4. Seek medical care immediately.

Loose Objects in the Eye

Loose objects in the eye are the most frequent eye injury and can be very painful. Tearing is common because it is the body's way of trying to remove the object.

Care for Objects in the Eye

Try one or more of the following methods to remove the object:

1. Lift the upper lid over the lower lid so that the lower lashes can brush the object off the inside of the upper lid. Have the victim blink a few times and let the eye move the object out. If the object remains, keep the eye closed.
2. Try flushing the object out by rinsing the eye gently with warm water. Hold the eyelid open and tell the victim to move the eye as it is rinsed.
3. Examine the lower lid by pulling it down gently. If you can see the object, remove it with moistened sterile gauze or a clean cloth Figure 9.
4. Many foreign bodies lodge under the upper eyelid; however, expertise is required to invert the lid and remove the object. Examine the underside of the upper lid by grasping the lashes of the upper lid, placing a matchstick or cotton-tipped swab across the upper lid, and rolling the lid upward over the stick or swab. If you can see the object, remove it with moistened sterile gauze or a clean cloth.

CAUTION

DO NOT try to remove an object stuck in the eye.

CAUTION

DO NOT allow the victim to rub the eye.

DO NOT try to remove an embedded foreign object.

DO NOT use dry cotton (cotton balls or cotton-tipped swabs) or instruments such as tweezers to remove an object from an eye.

FYI

An Unresponsive Victim's Eyes

An unconscious victim may lose the reflexes such as blinking that protect the eye. If the eyes do not stay closed, keep them closed by covering them with moist dressings.

Light Burns to the Eye

Burns can result if a person looks at a source of ultraviolet light such as sunlight, arc welding, bright snow, or tanning lamps. Severe pain occurs 1 to 6 hours after exposure.

Care for Light Burns

1. Cover both eyes with cold, wet packs. Tell the victim not to rub the eyes.
2. Have the victim rest in a darkened room. Do not allow light to reach the victim's eyes.
3. Give pain medication, if needed.
4. Seek medical care.

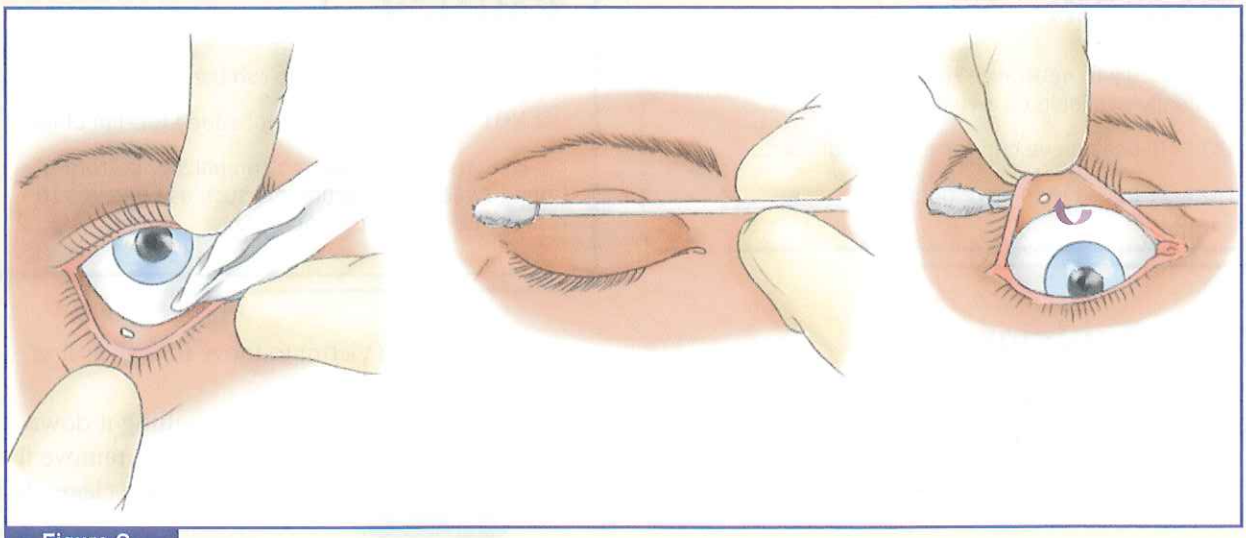


Figure 9

Removing loose objects from the eye. Lower lid: If tears or gentle flushing do not remove the object, gently pull down the lower lid. Remove an object by gently flushing with lukewarm water or by using wet, sterile gauze. Upper lid 1: Tell the person to look down. Pull gently downward on the upper eyelashes. Lay a swab or matchstick across the top of the lid. Upper lid 2: Fold the lid over the swab or matchstick. Remove an object by gently flushing with lukewarm water or by using wet, sterile gauze.

FYI

Contact Lenses

Determine whether a victim is wearing contact lenses by asking, by checking a driver's license, or by looking for them on the eyeball, using a light shining on the eye from the side. In cases of chemicals in the eye, lenses should be removed immediately. Usually the victim can remove the lenses.

Ear Injuries

Most ear problems are not life threatening. Fast action may be needed, however, to relieve pain and to prevent or reverse hearing loss. Head trauma may involve the ear. Foreign bodies in the ear canal usually produce overzealous removal attempts. Except for disk batteries (which damage moist tissue by creating a current) and live insects, few foreign bodies must be extracted immediately. First aiders should seek medical care for the victim because attempts to remove a foreign body from the ear can rupture the eardrum or lacerate the ear canal.

A live insect crawling around in the ear canal can be very uncomfortable for the victim. Shine a small light into the ear. Sometimes the insect will crawl out toward the light. If it will not leave the ear, drown the insect by placing several drops of light mineral oil or vegetable oil (not motor oil) into the ear. Often the insect will crawl out before it dies. When it stops moving and the insect is near the opening, carefully irrigate the ear with warm water. The insect should wash out. If that is unsuccessful, use a bulb syringe to suck the insect out. If the insect cannot be removed, seek medical care.

Children insert all sorts of things into their ears that may be impossible for you to remove safely. If the object is visible near the ear canal opening and you feel it is safe, cautiously try to remove the object with tweezers. Small objects can sometimes be removed by irrigating the ear with warm water. Do not try irrigation if the object blocks the entire ear canal or if the object is vegetable matter such as a kernel of corn or a bean, which will swell when wet.

Nose Injuries

Nosebleeds

A severe nosebleed frightens the victim and often challenges the first aider's skill. Most nosebleeds are self-limiting and seldom require medical attention. In cases of accompanying head or neck injuries, stabilize

the head and neck for protection. In some cases, loss of blood could cause shock.

There are two types of nosebleeds:

- Anterior nosebleed (front of nose) is the most common type (90%). Blood flows from the nose through one nostril.
- The posterior nosebleed (back of nose) involves massive bleeding, usually backward into the mouth or down the back of the throat. A posterior nosebleed is serious and requires medical care.

Care for Nosebleeds

To care for an anterior nosebleed, follow these guidelines from the American Academy of Otolaryngology:

1. Keep the head higher than the level of the heart. Have the victim sit and lean slightly forward to prevent blood draining into the throat.
2. Pinch the soft parts of the nose together between your thumb and two fingers Figure 10.
3. Continue compressing the pinched parts for 5 to 10 minutes.
4. Apply ice (crushed in a plastic bag or washcloth) to the nose and cheeks.

If bleeding continues:

1. Clear the nose of all blood clots by gently blowing the nose.
2. If available, spray a decongestant spray (such as Afrin or Neo-Synephrin) into the nostril.
3. Pinch the nose again for 10 minutes.
4. If the nosebleed continues, seek medical care.

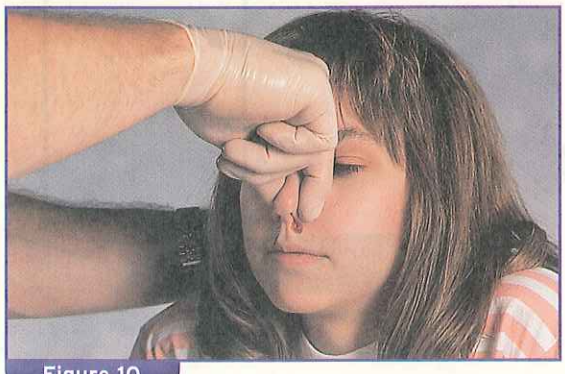


Figure 10

Control bleeding from the nose by pinching the nostrils together.

CAUTION

DO NOT allow the victim to tilt the head backward.

DO NOT probe the nose with a cotton-tipped swab.

DO NOT move the victim's head and neck if a spinal injury is suspected.

Seek professional medical help if:

- Bleeding cannot be stopped or keeps reappearing.
- Bleeding is rapid or blood loss is large.
- Weakness or fainting is present.
- Blood begins to go down the back of the throat rather than out the front of the nose.

Care After a Nosebleed

After a nosebleed has stopped, suggest that the victim:

- Sneeze through an open mouth, if he or she needs to sneeze.
- Avoid bending over and participating in too much physical exertion.
- Elevate the head with two pillows when lying down.
- Keep the nostrils moist by applying a little petroleum jelly just inside the nostril for 1 week; increase the humidity in the bedroom during the winter months by using a cold-mist humidifier.
- Avoid picking or rubbing the nose.

Broken Nose

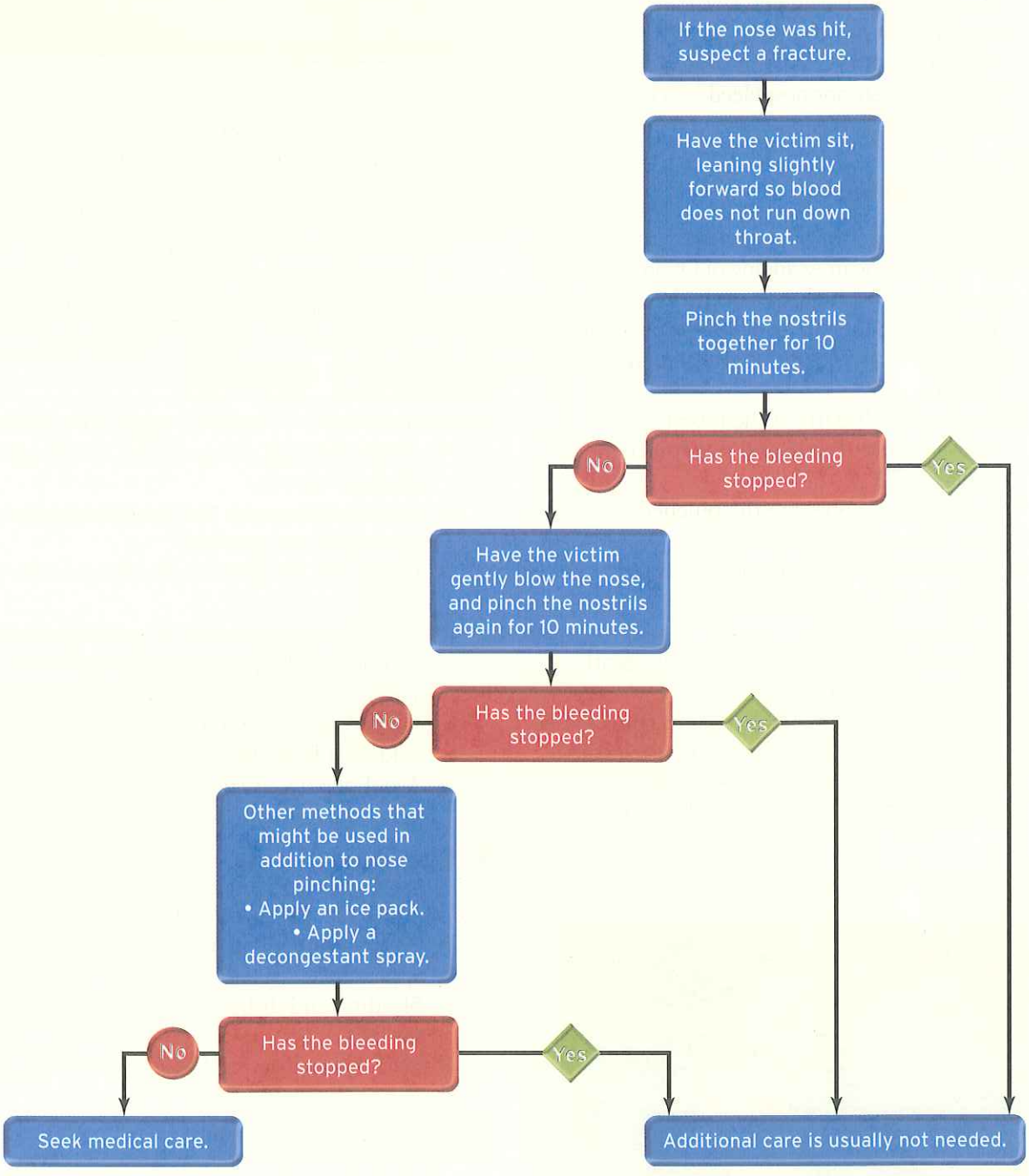
The signs of a broken nose include the following:

- Pain, swelling, and a possible crooked appearance
- Bleeding and difficulty breathing through the nostrils
- Black eyes appearing 1 to 2 days after the injury

Care for a Broken Nose

1. Seek medical care.
2. If bleeding is present, give care as for a nosebleed.
3. Apply an ice pack to the nose for 15 minutes at a time throughout the day.
4. Do not try to straighten a crooked nose.

Nosebleeds


If the nose was hit, suspect a fracture.
Have the victim sit, leaning slightly forward so blood does not run down throat.
Pinch the nostrils together for 10 minutes.
Has the bleeding stopped?
No
Yes
Have the victim gently blow the nose, and pinch the nostrils again for 10 minutes.
Has the bleeding stopped?
No
Yes
Other methods that might be used in addition to nose pinching:
• Apply an ice pack.
• Apply a decongestant spray.
Has the bleeding stopped?
No
Yes
Seek medical care.
Additional care is usually not needed.

Objects in the Nose

A foreign object in the nose is a problem mainly among small children, who seem to gain satisfaction from putting peanuts, beans, raisins, and other similar objects into their nostrils.

Care for Objects in the Nose

To remove objects from the nose, try one or more of the following methods:

1. Induce sneezing by having the victim sniff pepper or by tickling the opposite nostril.
2. Have the victim blow gently while you put compression on the opposite nostril.
3. Use tweezers to pull out an object that is visible. Do not probe or push an object deeper.
4. Seek medical care if the object cannot be removed.

Dental Injuries

Because dental emergencies generally cause considerable pain and anxiety, managing them promptly can provide great relief to the victim.

Objects Caught Between the Teeth

The signs of an object caught between teeth include the following:

- Victim says that something is caught between his or her teeth. This is the main method of detecting the problem.
- The object may or may not be seen. Even with the use of a flashlight, it is still difficult to see a small object.

Care for Objects Caught Between the Teeth

1. Try to remove the object with dental floss. Guide the floss carefully to avoid cutting the gums. Do not try to remove the object with a sharp or pointed instrument.
2. If unsuccessful, seek dental care.

Bitten Lip or Tongue

The signs of a bitten lip or tongue include the following:

- Immediate pain when it happens.
- Blood may be seen.

Care for a Bitten Lip or Tongue

1. Apply direct pressure to the bleeding area with sterile gauze or a clean cloth.
2. Clean the area with a cloth.
3. If swelling is present, apply an ice pack or have the victim suck on a popsicle or ice chips.
4. If the bleeding does not stop, seek medical care.

Loosened Tooth

Trauma can cause teeth to become loosened in their sockets. Applying pressure on either side of each tooth with the fingers can determine looseness. Any tooth movement, even if it is barely felt, indicates a possibly loose tooth.

Care for a Loosened Tooth

1. Have the victim bite down on a piece of gauze to keep the tooth in place.
2. Consult a dentist or an oral surgeon

Knocked-Out Tooth

A knocked-out tooth is a dental emergency but it is also a common one. A majority of the teeth knocked out each year in the United States could be saved with proper treatment Figure 11. Emergency care for knocked-out teeth has changed dramatically in recent years. The first question you want to ask when a tooth has been knocked out is, "Where is the tooth?" Time is crucial for successful

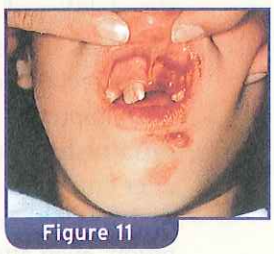


Figure 11

Knocked-out tooth.

reimplantation. After a tooth is knocked out, ligament fiber fragments remain attached to the tooth and to the bone in the socket. These ligament fibers begin to die soon after the injury. Therefore, it is important to prevent the tooth from drying and to protect the ligament fibers from damage. Moisture alone is not sufficient to preserve the tooth's ligament fibers. Steps must be taken to prevent the tooth from becoming dehydrated and to protect the ligament fibers from damage

Care for a Knocked-Out Tooth

1. Have the victim rinse his or her mouth, and, if bleeding, put a rolled gauze pad in the socket to control the bleeding.
2. Find the tooth and handle it by the crown, not the root, to minimize damage to the ligament fibers.
3. A tooth often can be successfully reimplanted if it is replaced in its socket within 30 minutes after the injury; the odds of successful reimplantation decrease about 1% for every minute the tooth is absent from the socket.
   - One of the worst things you can do to a knocked-out tooth is to transport it dry. Consider using the victim's own saliva for the short term (less than 1 hour). Whole milk is much better because it maintains the vitality of the ligaments for 3 hours. Ideally, the milk should be kept cold to minimize bacterial growth. Do not use reconstituted powdered milk or milk by-products such as yogurt; they can damage the ligaments.
   - The best transport medium is Hank's solution, a balanced-pH cell-culture medium that helps restore the ligament fibers. The use of Hank's solution extends the viability of the ligament fibers for 6 to 12 hours. The solution, which is available commercially as the Save-a-Tooth kit, has been approved by the US Food and Drug Administration for use up to 24 hours after an injury, and there is some evidence that using it enables successful reimplantation, even after 96 hours. A tooth-saving kit is available in drugstores or online and deserves consideration as a standard item at schools, sporting events, and summer camps.

CAUTION

DO NOT handle a knocked-out tooth roughly.

DO NOT put a knocked-out tooth in water, mouthwash, alcohol, or povidone iodine (Betadine).

DO NOT put a knocked-out tooth in skim milk, reconstituted powdered milk, or milk by-products such as yogurt.

DO NOT rinse a knocked-out tooth unless you are reinserting it in the socket.

DO NOT place a knocked-out tooth in anything that can dry or crush the outside of the tooth.

DO NOT scrub a knocked-out tooth or remove any attached tissue fragments.

DO NOT remove a partially extracted tooth. Push it back into place and seek a dentist so the loose tooth can be stabilized.

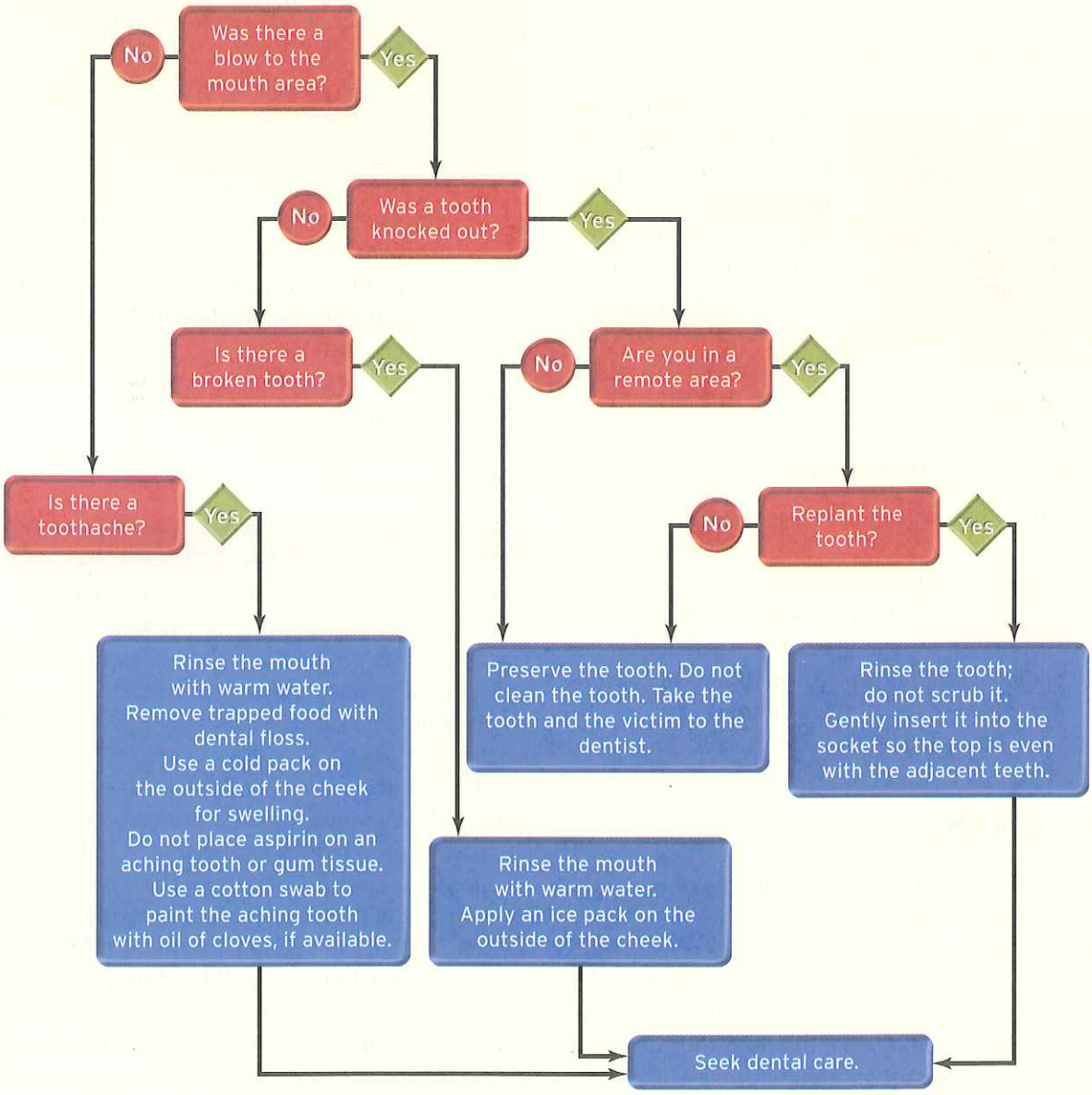
FYI

First Aid

If you are in a remote area with no dentist nearby, you can make a temporary cap from melted candle wax or paraffin and a few strands of cotton. When the wax begins to harden but can still be molded, press a wad of it onto the tooth. Other improvisations include using ski wax or chewing gum (preferably sugarless).

   - Some experts recommend that the tooth be placed in the victim's mouth to keep it moist until dental treatment is available. Do not use this method for children or others who may swallow the tooth.
4. Take the victim and the tooth immediately to a dentist.
5. If you are in a remote location, try to replace the tooth into the socket, using adjacent teeth as a guide. Apply pressure on the tooth so the top is even with the adjacent teeth. Asking the victim to bite down gently on gauze is helpful. Immediate reinsertion is not always possible, however. The victim may be reluctant to put the knocked-out tooth back into its socket, especially if it has fallen on the ground and is covered with debris—or the tooth may

Dental Injuries



repeatedly fall out, putting the victim at risk of inhaling or swallowing it. Do not use this method for children or others who may swallow the tooth. In victims with multiple trauma, the presence of more serious injuries may prevent reinsertion.

Broken Tooth

Figure 12

Broken teeth.

The front teeth are frequently broken by falls or direct blows Figure 12. Such damage is not unusual in the victims of violent acts or motor vehicle crashes. It is also common in children, especially those with an overbite.

Care for a Broken Tooth

1. Rinse the mouth with warm water to clean the area.
2. Apply an ice pack on the face in the area of the injured tooth to decrease swelling.
3. If you suspect a jaw fracture, stabilize the jaw by wrapping a bandage under the chin and over the top of the head.
4. Seek immediate dental care.

Toothache

The most common reason for toothaches is dental decay. Victims frequently report pain limited to one area of the mouth, although it can be more widespread; pain can also affect the ear, eye, neck, or even the opposite side of the jaw. The tooth will be sensitive to heat and cold. Identify the diseased tooth by tapping the area with a spoon handle or similar object. A diseased tooth will hurt.

Care for a Toothache

1. Rinse the mouth with warm water to clean it out.
2. Use dental floss to remove any food that might be trapped between the teeth.
3. If you suspect a cavity, paint the tooth by using a small cotton swab soaked in oil of cloves (eugenol) (or Orajel) to help suppress the pain. Take care to keep the oil off the gums, lips, and inside surfaces of the cheeks. If applicable, follow the same procedures as for a broken tooth.
4. Give the victim acetaminophen or ibuprofen for pain.
5. Seek dental care.

CAUTION

DO NOT place pain medication (such as aspirin, acetaminophen, or ibuprofen) on the aching tooth or gum tissues or allow them to dissolve in the mouth. A serious acid burn can result.

DO NOT cover a cavity with cotton if there is any pus discharge or facial swelling. See a dentist immediately.

DO NOT stick anything into an exposed cavity or into a softened exposed root.

Spinal Injuries

The *spine* is a column of vertebrae stacked on one another from the tailbone to the base of the skull. Each vertebra has a hollow center through which the spinal cord passes. The spinal cord consists of long tracts of nerves that join the brain with all other body organs and parts.

If a broken vertebra pinches spinal nerves, paralysis can result. All unresponsive victims should be treated as though they have a spinal injury. All responsive victims sustaining injuries from falls, diving accidents, or motor vehicle crashes should be carefully checked for a spinal injury before being moved Figure 13. Suspect a spinal injury in all head-injury victims.

A mistake in the handling of a spinal injury victim could mean a lifetime of paralysis for the victim. Suspect a spinal injury whenever a significant cause of injury occurs.

Recognizing Spinal Injuries

Because the head may have been snapped suddenly in one or more directions, anytime there is a head injury, there may also be a spinal cord injury. About 15% to 20% of head-injury victims also have a spinal injury. Other signs and symptoms include the following:

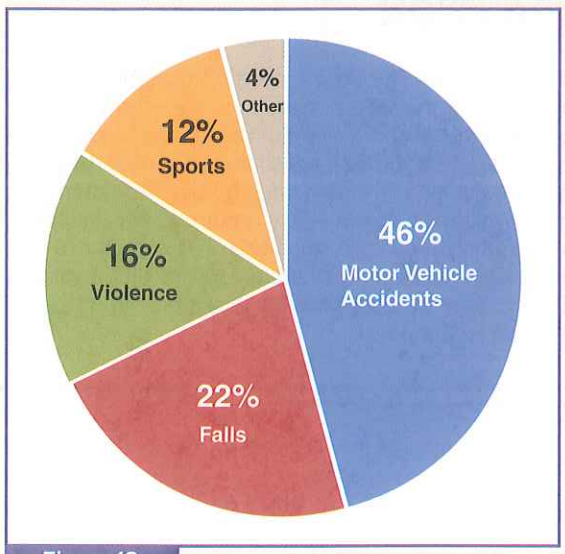


Figure 13

Common causes of spinal cord injury.

- Pain radiating into the arms or legs
- Neck or back pain
- Numbness, tingling, weakness, burning, or lessened sensation in the arms or legs
- Loss of bowel or bladder control
- Paralysis of the arms or legs
- Deformity (odd-looking angle of the victim's head and neck)

Ask a responsive victim these questions and follow these steps Skill Drill 1:

- Is there pain? Neck (cervical spine) injuries radiate pain to the arms; upper-back (thoracic spine) injuries radiate pain around the ribs; lower-back injuries usually radiate pain down the legs. Often, the victim will describe the pain as "electric."
- Can you wiggle your fingers? Moving the fingers is a sign that nerve pathways are intact (**Step** 1).
- Can you feel this pressure on your finger? Pinch the tip of the victim's finger to check for spinal injury (**Step** 2).
- Can you squeeze my hand? Ask the victim to grip your hand. A strong grip indicates that an upper spinal injury is unlikely (**Step** 3).
- Can you wiggle your toes? Moving the toes is a sign that nerve pathways are intact (**Step** 4).
- Squeeze the victim's toes (**Step** 5).
- Can you push your foot against my hand? Ask the victim to press a foot against your hand (**Step** 6). If the victim cannot perform this movement or if the movement is extremely weak against your hand, the victim may have a spinal injury.

If the victim is unresponsive, do the following:

- Look for cuts, bruises, and deformities.
- Test responses by pinching the victim's hand (the palm or back of the hand) and bare foot (the sole or the top of the foot). No reaction could mean spinal cord damage Skill Drill 2:

1. Pinch the victim's hand for a response (**Step** 1).
2. Pinch the victim's foot for a response (**Step** 2).
3. Test the spinal cord by using the Babinski test (**Step** 3): Stroke the bottom of the foot firmly toward the big toe with a key or similar blunt object. The body's normal response is to move the big toe down (except in infants). If the spinal cord or brain is injured, the big toe in an adult and a child will flex upward.
4. Ask bystanders what happened. If you still are not sure about a possible spinal injury, assume the victim has one until it is proved otherwise.

Care for a Spinal Injury

1. Monitor breathing. For an unresponsive victim, open the airway and check for breathing.
2. Stabilize the victim to prevent movement by using one of the following methods. Whichever method you use, tell the victim not to move.
   - Grasp the victim's head over the ears and hold the head and neck still until the EMS arrives Figure 14.
   - If you anticipate a long wait for EMS or you are tired from holding the victim's head in place, kneel with the victim's head between your knees or place objects on each side of the victim's head to prevent it from rolling from side to side.

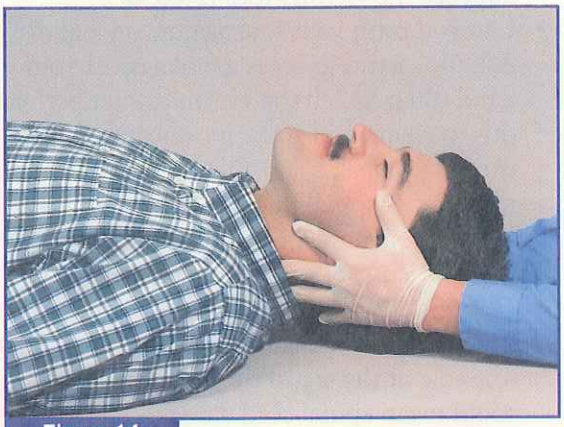


Figure 14

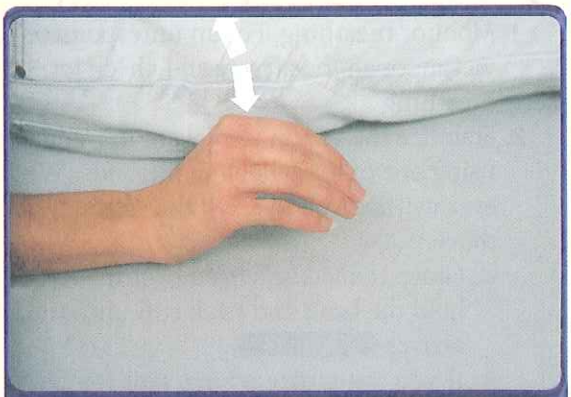
Steady and support the victim's head and neck as soon as possible. Have a bystander steady and support the feet. The head and feet should be continuously supported until medical help takes over. Stabilize by holding the head. Keep your arms steady by placing them on your thighs. To free yourself to help others, place heavy objects on each side of the head.

CAUTION

DO NOT move the victim, even if the victim is in water. (For a water-related rescue, manually stabilize the victim while floating on the water's surface.) Wait for EMS personnel to arrive; they have the proper training and equipment. Victims with suspected spinal injury require cervical collars and stabilization on a spine board. It is better to do nothing than to mishandle a victim with a spinal injury, unless the victim's location puts him or her in additional danger.

skill drill

1 Checking for Spinal Injuries in a Responsive Victim



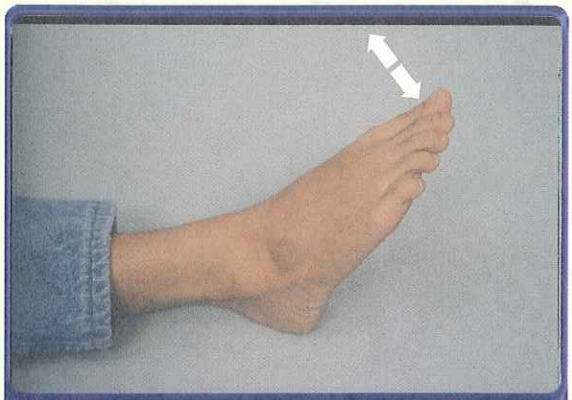
1 Victim wiggles fingers.

2 Rescuer squeezes fingers.

skill drill

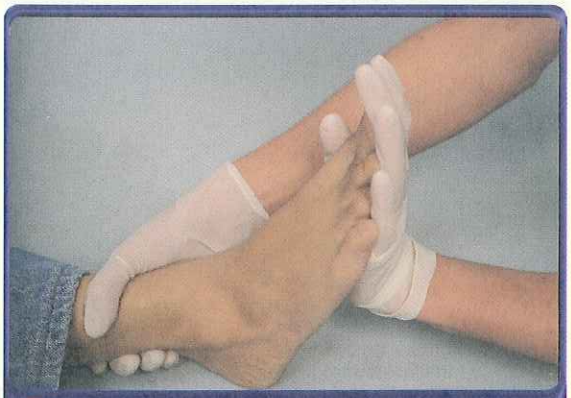
1 Checking for Spinal Injuries in a Responsive Victim (*continued*)

3 Victim squeezes rescuer's hand.



4 Victim wiggles toes.

5 Rescuer squeezes toes.

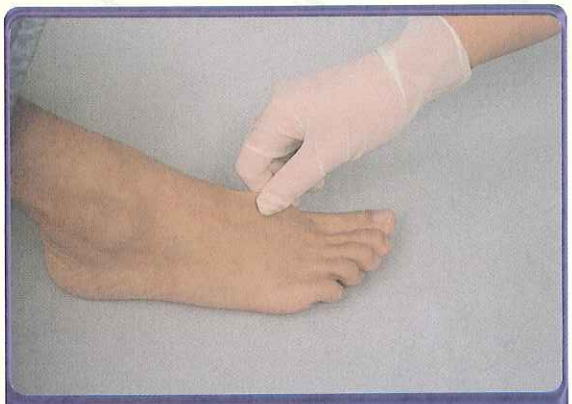


6 Victim pushes foot against rescuer's hand.

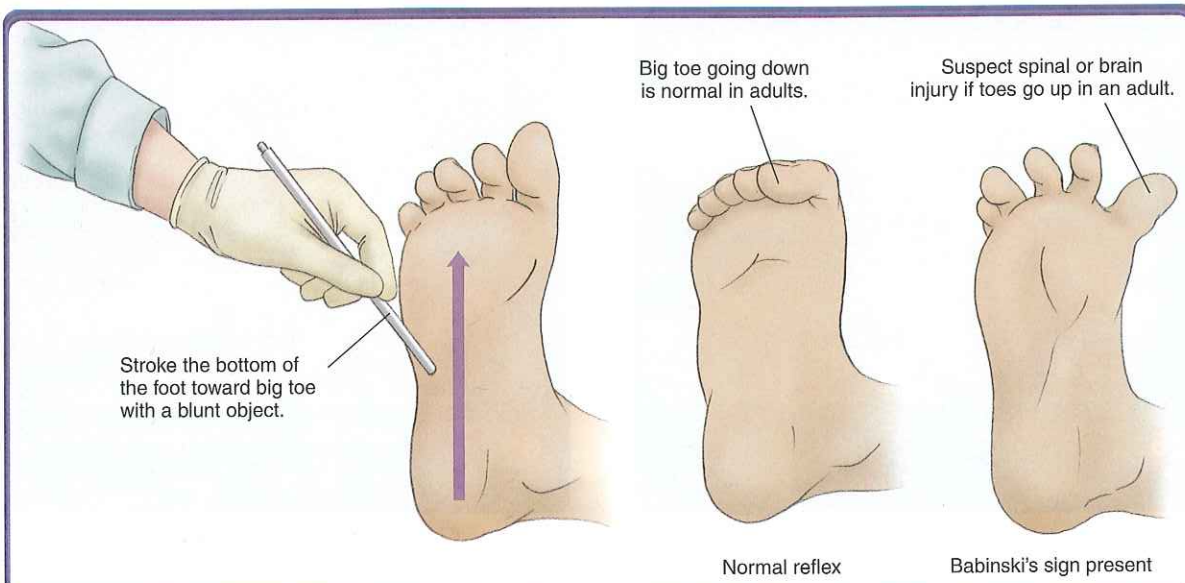
skill drill

2 Checking for Spinal Injuries in an Unresponsive Victim

1 Pinch the hand for a response.

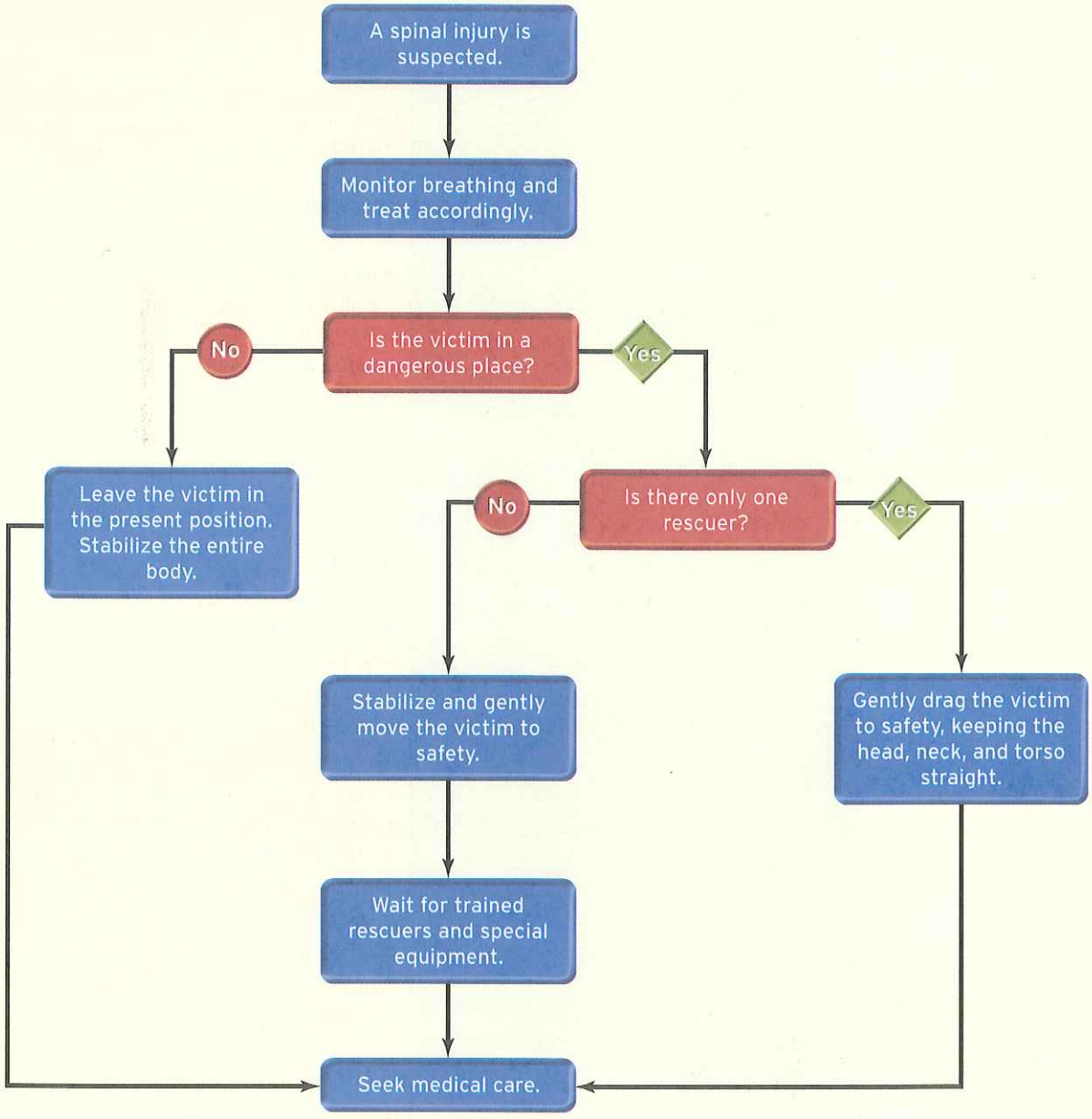


2 Pinch the foot for a response.



3 Babinski test for a response.

Spinal Injuries



Emergency Care Wrap-up

Condition	What to Look For	What to Do
Head Injuries	Scalp wound	Apply a sterile or clean dressing and direct pressure to control bleeding. Keep the head and shoulders raised. Seek medical care.
	Skull fracture	Monitor breathing and provide care if needed. Control bleeding by applying pressure around the edges of the wound. Stabilize the victim's head and neck against movement. Seek medical care.
	Brain injury (concussion)	Monitor breathing and provide care if needed. Stabilize the victim's head and neck against movement. Control any scalp bleeding. Seek medical care.
Eye Injuries	Loose object in eye	Look for object underneath both lids. If seen, remove with wet gauze.
	Penetrating eye injury	If object is still in eye, protect eye and stabilize long objects. Call 9-1-1.
	Blow to the eye area	Apply an ice or cold pack. DO NOT place ice or cold pack on eyeball. Seek medical care if vision is affected.
	Eye avulsion	Cover eye loosely with wet dressing. DO NOT try to put eye back into socket. Call 9-1-1.
	Cuts of eye or lid	If eyeball is cut, DO NOT apply pressure. If only eyelid is cut, apply dressings with gentle pressure. Call 9-1-1.
	Chemical in eye	Flush with warm water for 20 minutes. Seek medical care.
	Eye burns from light	Cover eyes with cold, wet dressings. Seek medical care.
Nose Injuries	Nosebleed	Keep the victim sitting up with the head level or tilted forward slightly. Pinch the soft parts of the nose for 5 to 10 minutes. Seek medical care if: • Bleeding does not stop • Blood is going down throat • Bleeding is associated with a broken nose
	Broken nose	Care as for a nosebleed. Apply an ice or cold pack for 15 minutes at a time. Seek medical care.

Condition	What to Look For	What to Do
Dental Injuries	Bitten lip or tongue	Apply direct pressure. Apply an ice or cold pack.
	Knocked-out tooth	Control bleeding (place rolled gauze in socket). Find tooth and preserve it in milk or the victim's saliva. Handle the tooth by the crown, not the root. Take the tooth with the victim to a dentist.
	Toothache	Rinse the mouth and use dental floss to remove trapped food. Give pain medication. Seek dental care.
Spinal Injuries	Spinal injury Inability to move arms and/or legs or painful to move them Numbness, tingling, weakness, or burning feeling in arms and/or legs Deformity (head and neck at an odd angle)	Stabilize the head and neck against movement. If unresponsive, open the victim's airway and check breathing. Call 9-1-1.

prep kit

Ready for Review

- Any head injury is potentially serious. If not properly treated, injuries that seem minor could become life threatening.
- Scalp wounds bleed profusely because the scalp has a rich supply of blood.
- A skull fracture is a break or crack in the cranium. Skull fractures may be open or closed.
- Injuries to the brain cause short- and long-term problems.
- An injured eye probably causes the most anxiety and concern in a victim.
- Penetrating eye injuries are severe injuries that result when a sharp object penetrates the eye.
- Blows to the eye can range in severity from minor to sight threatening.
- Cuts of the eye or lid require medical care.
- Chemicals in the eyes can threaten sight.
- A blow to the eye can knock it from its socket.
- Loose objects in the eye are the most frequent eye injury and can be very painful.
- Burns to the eye can result if a person looks at a source of ultraviolet light.
- Most ear injuries are not life threatening, but fast action may be needed to relieve pain or to prevent or reverse hearing loss.
- Most nosebleeds are self-limiting and seldom require medical attention.
- A foreign object in the nose is a problem mainly among small children who put small objects up their nostrils.
- Because dental emergencies generally cause considerable pain and anxiety, managing them promptly can provide great relief to the victim.
- Trauma can cause teeth to become loosened in their sockets.
- A knocked-out tooth is a dental emergency.
- The front teeth are frequently broken by falls or direct blows.
- The most common reason for toothaches is dental decay.
- A mistake in the handling of a spinal injury victim could mean a lifetime of paralysis for the victim.

Vital Vocabulary

anterior nosebleed Bleeding from the front of the nose.

Battle's sign A contusion on the mastoid area of either ear; sign of a basilar skull fracture.

concussion A temporary disturbance of brain activity caused by a blow to the head.

contusion A bruise; an injury that causes a hemorrhage in or beneath the skin but does not break the skin.

posterior nosebleed Bleeding from the back of the nose, which may flow out of the nostrils and into the mouth or throat.

skull fracture A break of part of the skull (head bones).

prep kit

Assessment in Action

While working at a construction site, you witness a fellow worker fall to the ground after being struck by a piece of wood thrown by a table saw. He was not wearing his safety glasses and you see a cut to his eyeball and eyelid.

Directions: Circle Yes if you agree with the statement; circle No if you disagree.

Yes No **1.** Apply pressure immediately to the injured eyeball.

Yes No **2.** Tell the victim to keep both eyes closed. Both eyes can be covered with a cravat or roller bandage.

Yes No **3.** Position the victim with his head elevated.

Yes No **4.** Medical care is not necessary in this case.

Check Your Knowledge

Directions: Circle Yes if you agree with the statement; circle No if you disagree.

Yes No **1.** Remove objects embedded in an eyeball.

Yes No **2.** Scalp wounds have very little bleeding.

Yes No **3.** Scrub and rinse the roots of a knocked-out tooth.

Yes No **4.** After a blow to the area around an eye, apply a cold pack.

Yes No **5.** Tears are sufficient to flush a chemical from the eye.

Yes No **6.** Use clean, damp gauze to remove an object from the eyelid's surface.

Yes No **7.** Preserve a knocked-out tooth in mouthwash.

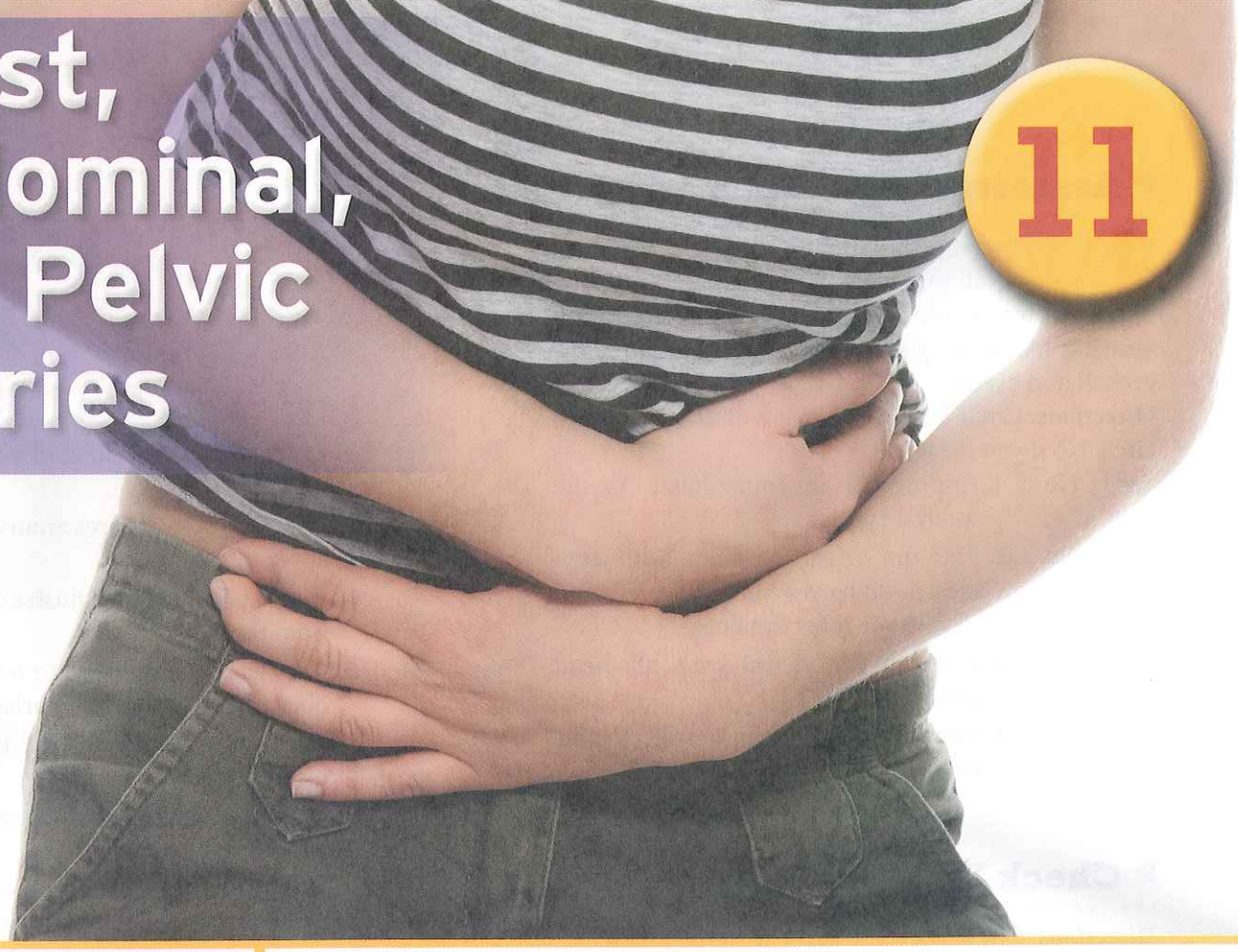
Yes No **8.** Do not move a victim with a suspected spinal injury.

Yes No **9.** Inability to move the hands or feet, or both, may indicate a spinal injury.

Yes No **10.** To care for a nosebleed, have the injured person sit down and tilt his or her head back.

Chest, Abdominal, and Pelvic Injuries

11



chapter at a glance

Chest Injuries

Chest injuries fall into two categories: open or closed. In open chest injuries, the chest wall is penetrated by some object (eg, knife, bullet). A closed chest injury is one in which the skin is not broken. The injury is caused by blunt trauma (eg, falling object, struck during a fight or assault).

All victims with chest injuries should have their breathing checked and rechecked. A responsive victim with a chest injury should usually sit up or, if the injury is on a side, be placed with the injured side down. This position prevents blood inside the chest cavity from seeping into the uninjured side and allows the uninjured side to expand.

Closed Chest Injuries

In a closed chest injury, the skin is not broken. Closed chest injuries include rib fractures and flail chest.

Rib Fractures

The upper four ribs are rarely fractured because they are protected by the collarbone and the shoulder blades. The upper four ribs are so enmeshed with the muscles that they rarely need to be splinted or realigned like other broken bones. The lower two ribs are difficult to