Introduction to Injury Care

Section 4

- Injuries can range from minor to life threatening, injuries are very common reasons for first aid
- Bleeding control is critical; can lead to death within minutes
- ** **For all further discussion and skills practice of injuries and illness, for teaching purposes only:**

We will assume the scene is safe / we have accessed the possible MOI, NOI / we have engaged bystanders / we have gained consent / we have taken precautionary PPE / we are washing with soap & water after treating.

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Dressings / Bandages

- Dressings (sterile dressings) go directly on the wound.
  - There are several different size and type dressings

    5x9 / 4x4 / 3x3 / 2x2 – Regular gauze and non stick dressings, z-fold dressings, compressed gauze, hemostatic gauze, roller gauze.

- Bandages hold the dressings in place
  - There are several different types of bandages

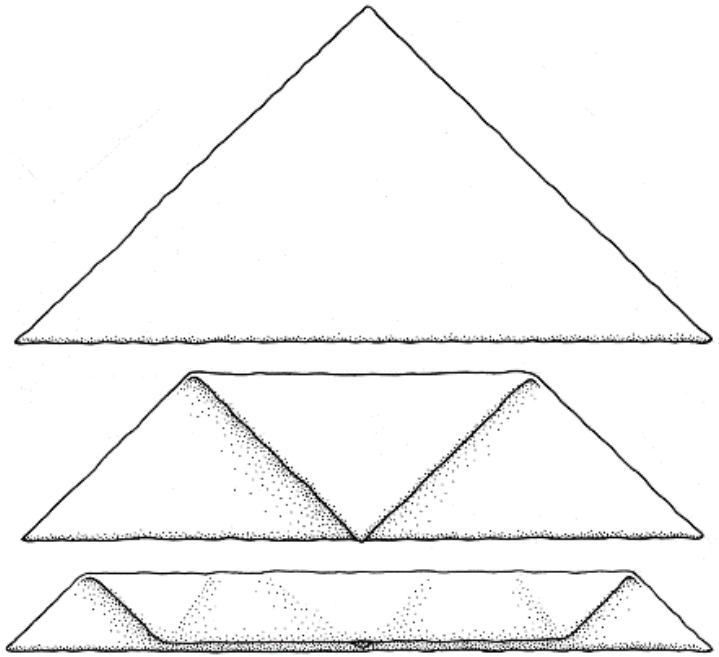
    Roller Gauze, Coban (self stick bandage), Band-Aid type, ACE type.

    Bandages do not touch the wound so they do not need to be sterile.

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Triangle Bandage Uses

- An **arm sling** for securing an arm or shoulder injury.
- An **arm sling** binder
- A **cravat bandage** to secure a dressing in place.
- A **cravat bandage** to hold splints in place
- An **improvised tourniquet**
- A **blood absorber** (if proper dressings are not available)
- A **mop** to get water off prior to using an AED
- A **donut** to pad an injury, skull injury or an impalement
- A **"Cold" bandana** - wet and place around your neck when overheating
- A "**sun shade"** for the back of your neck. Tuck it into your hat and let it drape over your neck



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Dressings

CAUTION

DO NOT use fluffy cotton or cotton balls as a dressing. Cotton fibers can enter the wound and become difficult to remove.

DO NOT pull off a dressing stuck to a wound. If the dressing needs to be removed, soak it off in warm water.

DO NOT touch any part of the wound or any part of the dressing that will be in contact with the wound, as this may be a source of infection.

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Bleeding Control

- Identifying life-threatening bleeding
  - Ask responsive person about bleeding
  - Look for flowing/spurting/pooling blood
  - Check wet spots on clothing
  - Full-body check for unresponsive person
  - Check the ground around the person
- Control of life-threatening bleeding comes before CPR.
- Do not assume the first source of bleeding is the only one.

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Bleeding Control

- External bleeding: blood coming from open wound
- Three types: capillary, venous, arterial

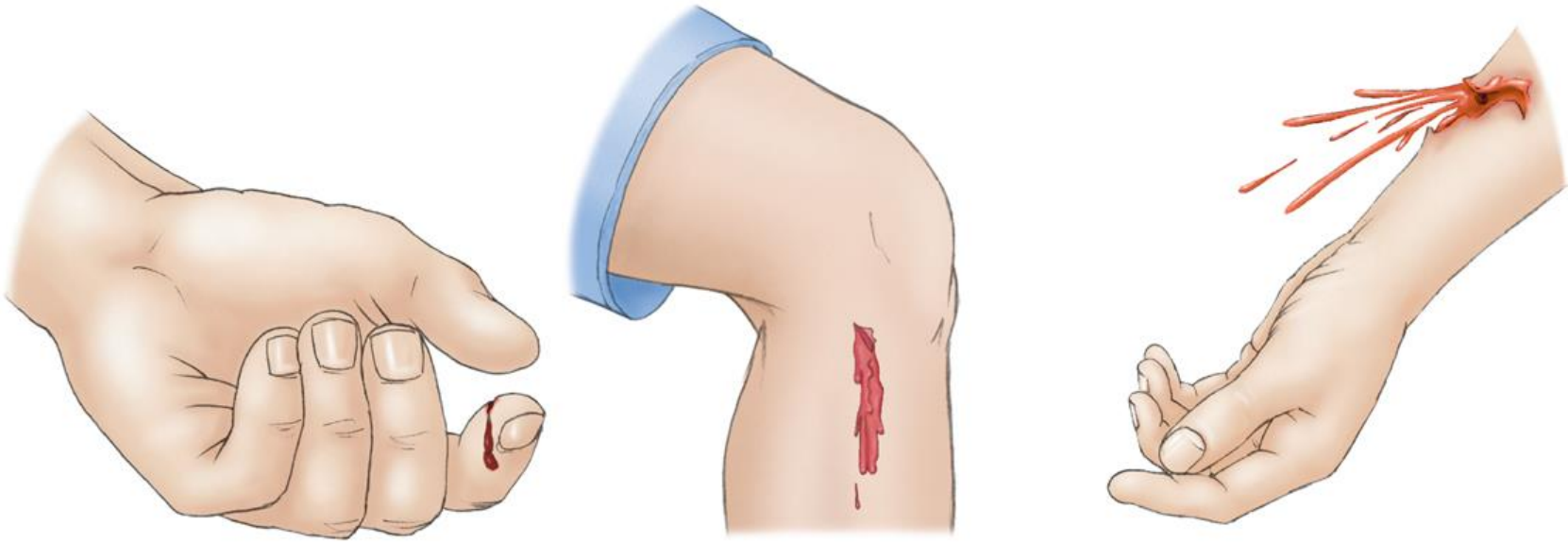


Figure 4-1

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Bleeding Control

- **Capillary:** (Scrapes / Road Rash), usually easily controlled.
- **Venous:** (Under negative pressure, dark red and oozing), usually easy to control, however, bleeding from deep veins can be massive.
- **Arterial:** (Under pressure and spurts bright red blood), hardest to control.

Note: *Elevation or pressure point compression have not proven to be effective.*

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Bleeding Control

Capillary Bleeding Control:

1) Clean the wound to remove debris - You can use running water or other irrigation.

2) If there is imbedded metal or glass, do not try to pull out debris, get to medical care.

3) Use a sterile dressing or clean cloth to put pressure on the wound. Avoid putting pressure on imbedded debris

4) Use an antibiotic ointment and non-adherent sterile dressing

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Bleeding Control

- **Venous Bleeding Control:**
- 1) Place a sterile gauze dressing, or clean cloth over the wound and apply direct pressure.
- 2) If the first dressing becomes blood soaked, add more dressings. Do not remove the dressing closest to the wound, the others can be removed as not to displace pressure. Too many dressings can diffuse pressure!
- 3) If the bleeding does not stop within 10 minutes, press harder over a wider area. **DEMO PROPER PRESSURE**

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Bleeding Control

Venous Bleeding Control Continued:

4) Once bleeding has stopped, apply a bandage firmly over the dressing to hold the it in place.

• The bandage should wrap Distal to Proximal. A twist of the bandage over the point of injury can help apply pressure to the dressing. After bandaging, check for CSM distal to the bandage to make sure it's not too tight.

i. **C**irculation - (Check Capillary Refill)

ii. **S**ensation - (Can they feel which finger/toe you are touching?)

iii. **M**ovement - (Can they move their fingers/toes)

5) **Call EMS for any bleeding that is difficult to control**

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Bleeding Control

Arterial Bleeding Control: (arterial bleeding = spurting out bright red blood)

1) Call EMS for any major bleeding

2) Follow the steps above for venous bleeding control.*

3) If the bleeding continues and is not controlled with direct pressure, use other techniques such as a tourniquet or wound packing.

*Go directly to a tourniquet or wound packing for severe arterial bleeding.

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Bleeding Control

Arterial Bleeding Control Continued:

Tourniquet (manufactured) - for profuse bleeding of appendages (arms or legs).

1) Place 2 -3 inches above the wound (not on a joint) - Warn the injured person that pain is to be expected upon application of a tourniquet.

2) Tighten until the bleeding stops - NO Distal Pulse!

3) If the bleeding continues, apply a second tourniquet close to the first (above the first is preferable).

4) Note the time you applied the Tourniquet on the tourniquet or on the forehead of patient.

5) **Do not loosen or remove the Tourniquet once applied**

6) Any Arterial Bleeding must be followed up immediately by a medical professional.

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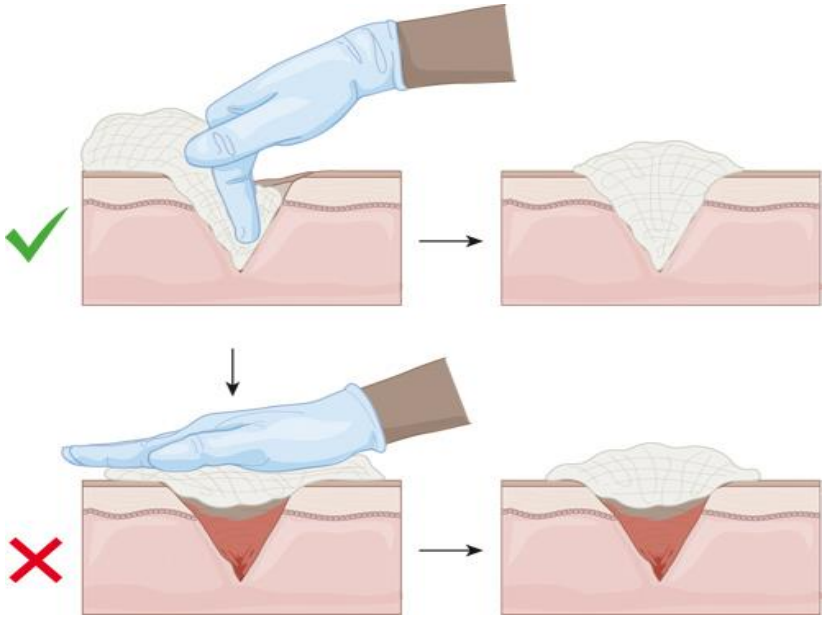
Bleeding Control

Arterial Bleeding Control Continued:

- Wound packing: deep wounds where pressure is not effective and tourniquet cannot be used (neck, groin, armpits, shoulders)
  - If possible, drain or absorb any pooled blood
  - Stuff wound with gauze and apply firm, direct pressure
  - Hemostatic gauze is treated with a chemical

  to help blood clot; must touch wound directly.





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Bleeding Control

- Special considerations
  - Steps for controlling bleeding are same in children and infants
    - Direct pressure can be used in all ages
    - Tourniquet use is limited only by size; DO NOT use an adult tourniquet on child or infant.
    - Use a Slishman Pressure Wrap on a child or infant.





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Bleeding Control

- Improvised tourniquets
  - Less reliable, more painful, and more difficult to apply; manufactured tourniquet should be in every first aid kit
  - To use:
    - Wrap cloth band (about 2 inches wide) around extremity twice in same location as for manufactured tourniquet
    - Place short rigid object on top and tie overhead knot
    - Twist object in one direction until bleeding stops, then secure object in place

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Common Tourniquet Mistakes

- Not using a tourniquet when you should
- Using a tourniquet for minimal bleeding
- Not making the tourniquet tight enough to effectively stop bleeding
- Using narrow material
- Waiting too long to put the tourniquet on
- Periodically loosening the tourniquet to allow blood flow to the injured extremity
- Not monitoring its effectiveness
- Applying over bulky clothing
- Using tourniquet that is too large

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For shallow wounds and scrapes, once bleeding stops:

- Gently wash in and around the wound with room temperature water with or without soap.
- Flush with pressurized water and pat dry (Irrigate from clean to dirty)
- If bleeding re-starts, apply direct pressure
- Apply a thin coating of antibiotic ointment (if the person is not sensitive)
- Cover with a sterile dressing and bandage
- DO NOT apply hydrogen peroxide, alcohol, or iodine

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Seek medical care for anything other than shallow wounds and scrapes, such as:

- Cuts that need stitches (Full thickness)
- Cuts from animal bites
- Cuts to an eyelid
- Cuts that remove all layers of skin (slicing off the tip of a finger)
- Puncture wounds
- Deep, jagged or gaping open wounds
- Cuts that are most likely infected or show signs of infection
- Uncontrolled bleeding
- Cut to the eye
- Open Fractures
- Arterial Bleeds

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Bleeding Control

- Demo Wound Irrigation (bag / bottle)
- Skill - Applying direct pressure with a dressing
- Skill - Apply bandage over the dressing (with twists)
- Show different types of tourniquets
- Demo a Manufactured Tourniquet
- Demo an Improvised Tourniquet from a triangle bandage
- Skill - Wound Packing

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Internal Bleeding (1 of 2)

- Skin is not broken, so blood is not seen (stays within the body)
- Minor Bruises only require icing and compression
- Major Bruises, injuries to internal organs or broken bones can cause serious internal blood loss – Medical care is needed!

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Internal Bleeding (2 of 2)

What to Look For	What to Do
▪ Bright red blood from the mouth or rectum, or blood in the urine ▪ Nonmenstrual vaginal bleeding ▪ Vomited blood; may be bright red or dark red, or look like coffee grounds ▪ Black, foul-smelling, tarry stools ▪ Pain, tenderness, bruising, or swelling ▪ Broken ribs, bruises over the lower chest, or a rigid abdomen	1. Call 9-1-1. 2. Monitor breathing. 3. Expect vomiting. If vomiting occurs, keep the person lying on their side to allow drainage and to prevent inhalation (aspiration) of vomitus. 4. Treat for shock (discussed later in this chapter) and cover the person with a coat or blanket for warmth. 5. Treat suspected internal bleeding in an extremity by applying a splint.
Bruises	1. Apply an ice pack over the injury for up to 20 minutes. 2. If an arm or a leg is involved, apply an elastic bandage for compression. Several layers of gauze pads or other cloth could be placed between the bandage and the injury to concentrate the compression on a specific location.

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Shock (1 of 5)

- Occurs when blood is not circulating well enough to meet body's needs (inadequate profusion to the organs)
  - Common cause of death in injured people

- Two types of concern to first aid providers:
  - Hypovolemic: body loses significant amount of blood or fluid
  - Anaphylactic (anaphylaxis): severe allergic reaction

Other types of shock: **Cardiogenic** (heart failure, Myocardial Infarction)
Obstructive (Pulmonary Embolism, Cardiac Tamponade, Tension pneumothorax)
Distributive (Sepsis, Anaphylaxis, Neurogenic, Psychogenic)
Hypovolemic (Bleeding Out, Dehydration)

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Shock (2 of 5)

What to Look For	What to Do
▪ Altered mental status: anxiety and restlessness ▪ Pale/ashen, cold, and clammy skin ▪ Pale/ashen or blue lips and/or nail beds ▪ Nausea/vomiting ▪ Rapid breathing ▪ Unresponsiveness when shock is severe	**1.** Call 9-1-1. **2.** Treat any life-threatening bleeding. Blood loss is a common cause of shock. **3.** If unresponsive and not breathing, start CPR. **4.** If breathing normally, position the person based on their condition and level of responsiveness. **5.** Prevent the loss of body heat by putting blankets or coats under and over the person.

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Shock (3 of 5)

CAUTION

DO NOT place people with breathing difficulties, chest injuries, penetrating eye injuries, or heart attacks on their backs. Place them in a half-sitting position or a position of comfort to help breathing.

DO NOT give the person anything to eat or drink.

DO NOT lift the foot of a bed or chair; doing so can impair breathing. Lift only the legs; this will help with circulation but will not impair breathing.

DO NOT raise the legs of a person with head injuries, stroke, chest injuries, or breathing difficulty, or a person in whom a heart attack is suspected.

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Shock (4 of 5)



Figure 4-4

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Shock (5 of 5)

- Shock in children
  - May not show symptoms in early stages, but will deteriorate quickly
  - Can develop shock after losing relatively small amount of blood
  - Dehydration is also a common cause
  - First aid is the same as for adults

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Amputations and Avulsions (1 of 5)

- Amputation: removal of a body part
- Avulsion: flap of skin torn loose but still hanging from body





Figure 4-13

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Center: © E.M. Singletary, M.D. Used with permission



Figure 4-14

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Amputations and Avulsions (2 of 5)

What to Look For	What to Do
Amputation	1. Call 9-1-1. 2. Take standard precautions (see pp. 14–20). Control bleeding by using direct pressure; if unsuccessful, apply a manufactured tourniquet or a hemostatic gauze dressing, if available. 3. Care for the amputated part: • Wrap the severed part in a sterile gauze or a clean cloth that has been dampened with water (make sure the excess water has been squeezed out) (**FIGURE 4-15A**). • Place the wrapped part in sealed plastic bag (**FIGURE 4-15B**). • Place the plastic bag in a container on ice (**FIGURE 4-15C**). **DO NOT** bury the part in the ice or allow it to touch the ice directly. **DO NOT** submerge it in water. • Send the part to the medical facility with the injured person. 4. If the amputated part is not found by the time EMS arrives, ask others to search for it and, if located, to take it to the same medical facility where the person is going.

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Amputations and Avulsions (3 of 5)

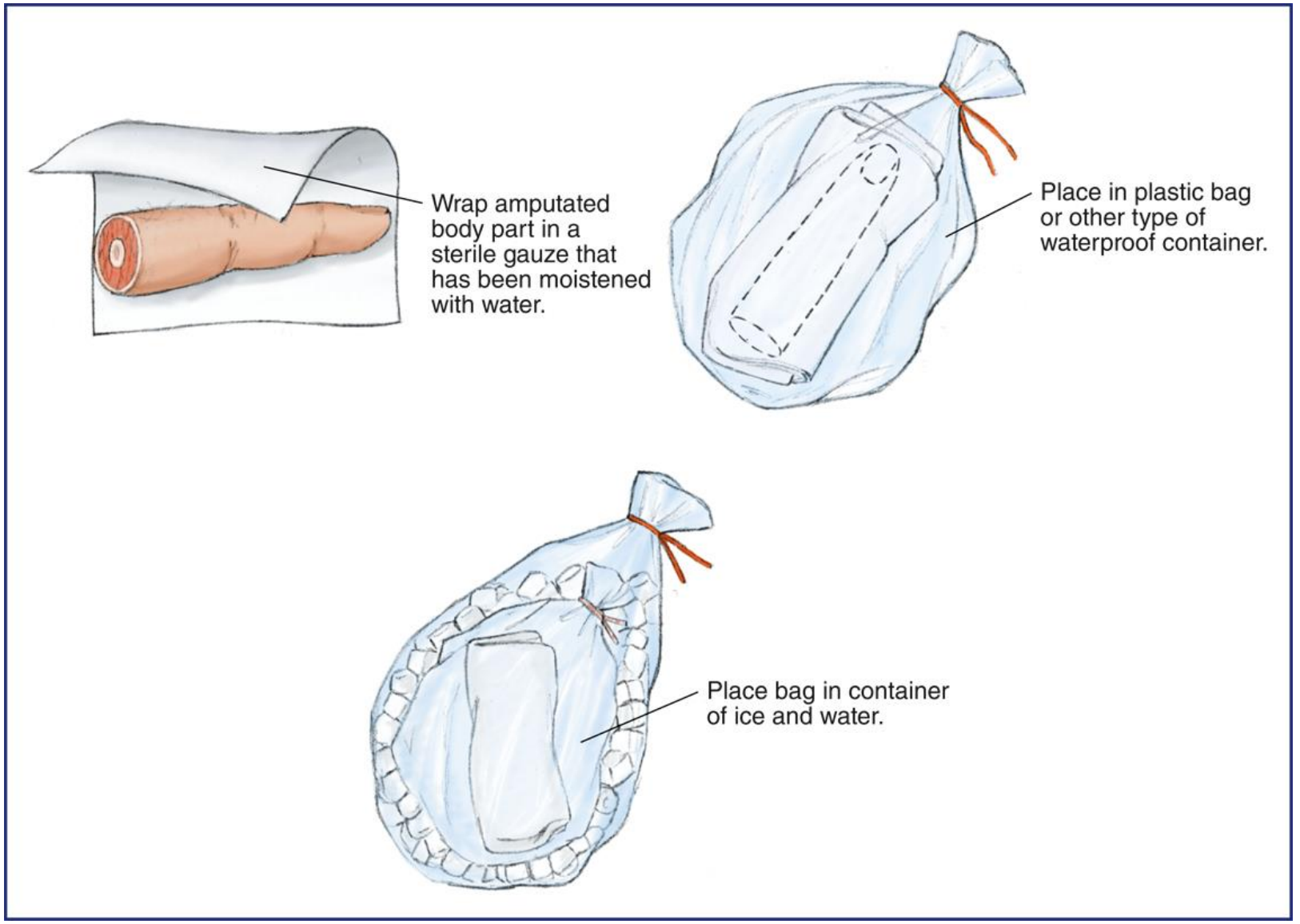


Figure 4-15

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Amputations and Avulsions (4 of 5)

What to Look For	What to Do
Avulsion	**1.** Take standard precautions (see pp. 14–20). **2.** Gently move the skin flap back to its normal position. **3.** Cover with a sterile or clean dressing and apply pressure. **4a.** If bleeding stops with direct pressure, then seek medical attention immediately. **4b.** If bleeding continues, call 9-1-1 and apply a tourniquet or a hemostatic gauze dressing, if available.

Note: When applying direct pressure to an Amputation or Avulsion, watch for sharp bones or bone fragments that may pierce your glove or skin under the glove.

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Amputations and Avulsions (5 of 5)

CAUTION

DO NOT try to decide whether a body part is salvageable or too small to save. Leave that decision to the emergency room physicians.

DO NOT wrap an amputated part in a soaking wet dressing or cloth. Doing so can cause waterlogging and tissue softening, which will make reattachment more difficult.

DO NOT bury an amputated part *in* ice; instead, place it in *ice water* (after carefully wrapping with moistened gauze and sealing inside a plastic bag). Reattaching frostbitten parts is usually unsuccessful.

DO NOT use dry ice.

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Impaled (Embedded) Objects

- Come in variety of shapes and sizes
- Small objects: remove with tweezers, then standard care for wound
  - Seek medical care if object cannot be removed
- Large objects: must be stabilized
- Reduce large objects if possible
- Do not remove large objects



Figure 4-16

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• If bleeding, apply direct pressure around the object, not on the object. No pressure against the sharp side of an object.

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Thermal Burns

- Caused by excessive heat exposure
- Classified by depth/extent of damage:
  - **Superficial:** top layer (formerly first-degree burns)
  - **Partial-thickness:** first and second layers (formerly second-degree)
  - **Full-thickness:** all layers (formerly third-degree burns)

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Thermal Burns

- First aid for all burns:
  - Stop the burning!
  - Check and monitor breathing
  - If clothing is on fire have the person roll on the ground
  - Remove Jewelry (especially rings)
  - Do not remove melted clothing
  - Determine depth of burn
  - Determine size of burn (Rule of the Hand)
  - Determine body part(s) burned



Figure 4-17

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Thermal Burns

- Call 9-1-1 for:
  - Burns to face, neck, hands, feet, genitals
  - Burns that encircle the entire arm or leg (swelling can act as a tourniquet)
  - Breathing difficulty
  - Large (>10% TBSA) partial-thickness burns
  - All full-thickness burns
  - Other concerns (coughing, wheezing, hoarseness, carbon monoxide exposure)
  - Burns in children younger then 14 years

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Superficial Burns

What to Look For	What to Do
Superficial burn (**FIGURE 4-18**), indicated by: ▪ Redness ▪ Mild swelling ▪ Tenderness ▪ Pain	1. Immerse the burned area in cool or cold water; place it under running cold water; or apply a wet, cool or cold compress for at least 10 minutes as soon as possible and until the pain is relieved (**FIGURE 4-19**). A clean, cool pad, but not freezing, can be useful for cooling a burn. 2. Keep a burned arm or leg raised to reduce swelling and pain. Remove rings and jewelry from burns, as swelling may occur and have a tourniquet effect. 3. Give ibuprofen to relieve pain and inflammation. For children and teenagers, give acetaminophen (Tylenol). Have the person drink water. 4. After the burn has been cooled, apply an aloe vera gel or skin moisturizer lotion to keep the skin moistened and to reduce itching and peeling. Use a lotion that does not have alcohols or strong fragrances. Lotions with glycerin and mineral oil are best. Aloe vera has antimicrobial and anti-inflammatory properties and is a mild analgesic.

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Thermal Burns



Figure 4-18

Superficial Burn

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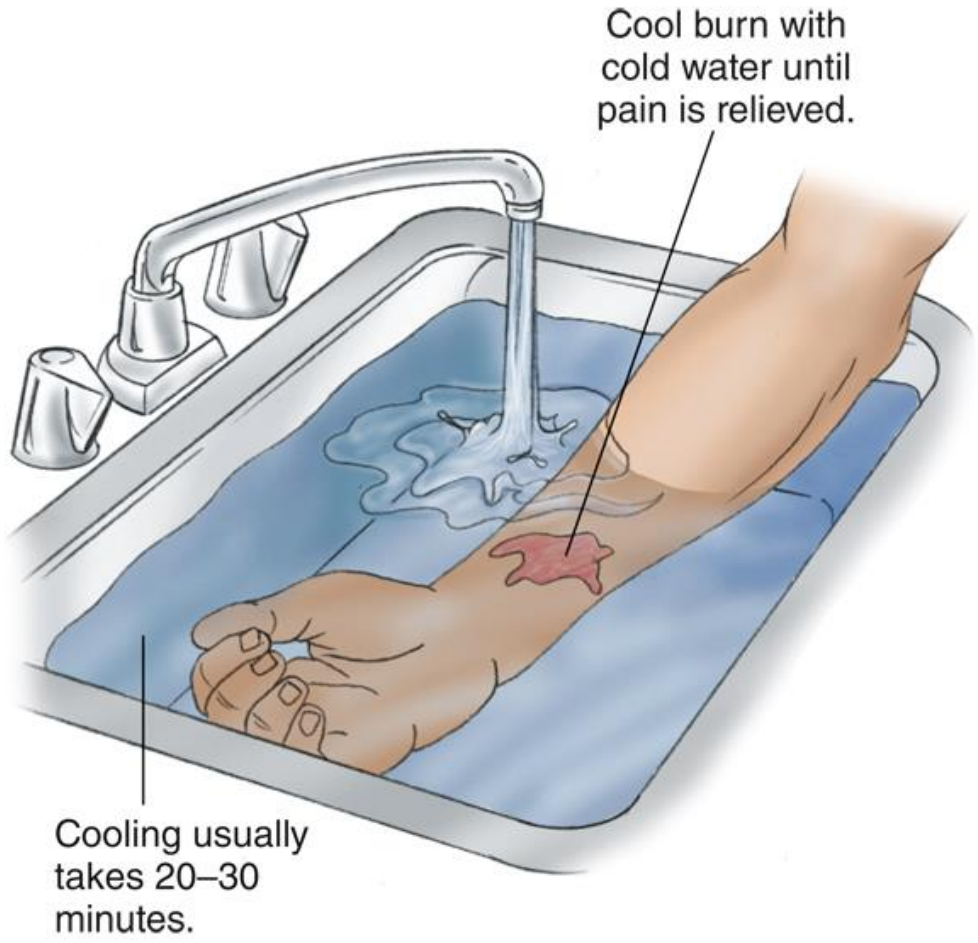


Figure 4-19

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Thermal Burns – Partial and Full Thickness

What to Look For	What to Do
Small (less than 10% adult TBSA) partial-thickness burn (**FIGURE 4-20**), indicated by: ▪ Blisters ▪ Swelling ▪ Weeping of fluids ▪ Severe pain	Follow Steps 1 and 2 for superficial burns, with the following additions: **1.** Cover the burn with a loose, dry, nonstick, sterile or clean dressing. Covering the burn reduces the amount of pain by keeping air from the exposed nerve endings. The main purpose of a dressing over a burn is to keep the burn clean, prevent evaporative moisture loss, and reduce pain. If fingers or toes have been burned, place dry dressings between them. **2.** Seek professional medical care.
Large (greater than 10% adult TBSA) partial-thickness burn	Follow Steps 1 and 2 for superficial burns, with the following additions: **1.** Call 9-1-1. **2.** Cover the burn with a loose, dry, nonstick, sterile or clean dressing.
Full-thickness burn (**FIGURE 4-21**), indicated by: ▪ Dry, leathery, gray-colored, or charred skin	**1.** Call 9-1-1. **2.** Cover the burn with a dry, nonstick, sterile or clean dressing.

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Thermal Burns



Figure 4-20

Partial Thickness Burn

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Figure 4-21

Full Thickness Burn

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Thermal Burns

- Special considerations
  - Burns in children are considered more serious than in adults
    - More susceptible to infection, shock and airway difficulties
    - Any burns in children younger than 14 years (or less than 66 lb) should be treated as severe

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Thermal Burns

CAUTION ⚠

DO NOT remove or pull on clothing stuck to the skin.
DO NOT apply cold over a large burn for a prolonged time (1 hour or more) because it can produce hypothermia.
DO NOT use an ice pack unless it is the only source of cold available. If you must use it, wrap the ice pack in a towel or other fabric and apply in short increments (10 minutes or less at a time).
DO NOT use ice water to cool a burn. Doing so can further damage the skin tissue.
DO NOT apply grease, butter, cream, or a home remedy. Such coatings are unsterile and can lead to infection. They also can seal in heat, causing further damage. **DO NOT** apply any ointments or creams to partial- or full-thickness burns, as they will need to be completely removed by the medical professionals providing care and can cause additional issues.
DO NOT cover a superficial burn.
DO NOT cool more than 20% of an adult's TBSA (10% for a child) except to extinguish flames.
DO NOT break any blisters. Intact blisters serve as excellent burn dressings. Cover a ruptured blister with dry, sterile dressing.
DO NOT use plastic as a dressing because it will trap moisture and provide a good place for bacteria to grow.

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Chemical Burns (1 of 3)

- Result of acid or alkali substance touching the skin
  - Must be removed from person as quickly as possible to stop the burning



Figure 4-23

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Figure 4-22

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Chemical Burns (2 of 3)

What to Look For	What to Do
▪ Pain ▪ Burning ▪ Breathing difficulty ▪ Eye pain or vision changes	First aid is the same for most chemical burns. **1.** Call 9-1-1. **DO NOT** approach the person if you may be exposed to the chemical or if the scene is otherwise unsafe. Once the area is safe: **2.** Gently brush a dry or powder chemical off the skin with a gloved hand or piece of cloth before flushing with water. **3.** Flush the area immediately with large amounts of cool running water for at least 20 minutes. Clothing can be removed while flushing. Remove rings and jewelry from a burn, as swelling may occur and create a tourniquet effect. **4.** For a chemical in an eye: Tilt the head so the affected eye is below the nose (**FIGURE 4-23**), and wash the eye with warm (not hot) water (which is better tolerated than cold water) from the nose out to the side of the face for at least 20 minutes. This will help prevent the chemical from flowing into the unaffected eye. **5.** If available, provide the name of the product or chemical (if in an occupational setting, bring the safety data sheet).

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Chemical Burns (3 of 3)

CAUTION

DO NOT waste time! A chemical burn is an emergency!
DO NOT apply water under high pressure; it will drive the chemical deeper into the tissue.
DO NOT try to neutralize a chemical even if you know which chemical is involved; heat may be produced, resulting in more damage. A product label's instructions for neutralizing may be wrong. Save the container or the label for the chemical's name.

"The Solution to Pollution is Dilution"

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Electrical Burns (1 of 2)

- Every person who has been electrocuted needs professional medical care
  - Major damage occurs inside body, so outside burn may be small
- If person is inside, turn off electricity or unplug appliance, if safe to do so
- If person is in contact with high-tension power line, call 9-1-1; DO NOT attempt to move or touch the power lines or person



Figure 4-24

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Electrical Burns (2 of 2)

What to Look For	What to Do
▪ Burn wound, which might appear small ▪ Entrance and exit wounds (Usually, the electricity exits where the body is touching a surface or is in contact with a ground [ie, a metal object]; this is often the hand or foot.) ▪ Multiple burns (Most electrical burns are full-thickness burns.) ▪ Absent breathing/pulse (Electricity can cause a person's breathing or heart to stop.)	Once the area is safe: **1.** Check breathing of any motionless and unresponsive person and, if absent, begin CPR. **2.** Call 9-1-1 immediately. Every person who has been electrocuted needs professional medical care. **3.** If the person fell, check for broken bones and a spinal injury. **4.** Most electrical burns are full-thickness burns, so cover all burn wounds with sterile dressings. Treat as you would a full-thickness burn.

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Skull Fractures (1 of 3)

- Break or crack in cranium; may be open or closed

What to Look For	What to Do
▪ Pain ▪ Skull deformity ▪ Bleeding from an ear or the nose ▪ Leakage of cerebrospinal fluid (clear or blood-tinged, watery fluid from an ear or the nose) ▪ Discoloration around the eyes (**FIGURE 4-25**) or behind the ears, known as Battle sign (**FIGURE 4-26**), that appears several hours after the injury ▪ Unequal-size pupils when both eyes are compared ▪ Heavy scalp bleeding (skull and/or brain tissue may be exposed) ▪ Penetrating or impaled object (do not remove)	**1.** Call 9-1-1. **2.** For an open wound, apply a sterile dressing over it, and hold it in place with gentle pressure. **3.** Control bleeding by pressing on the edges of the wound (to avoid pressing bone pieces into the brain) and gently on the center of the wound.

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Skull Fractures (2 of 3)



Figure 4-25 – Racoon Eyes

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Figure 4-26 – Battle Sign

Courtesy of Rhonda Hunt

Raccoon eyes (periorbital ecchymosis) and **Battle's sign** (mastoid ecchymosis) are classic, highly-specific clinical indicators of a basilar skull fracture. They occur when blood from a skull fracture at the base of the head leaks into the surrounding facial and ear tissues.

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Skull Fractures (3 of 3)

CAUTION

DO NOT stop the flow of blood or cerebrospinal fluid from an ear or nose. Blocking the flow could increase pressure on the brain.
DO NOT remove an impaled object from the head. Stabilize it in place with bulky dressings.
DO NOT press on the fractured area.
DO NOT clean an open skull fracture.

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Brain Injuries (1 of 3) Traumatic Brain Injuries

- Brain will swell from bleeding when injured, but there is little room to accommodate swelling in the skull
  - Results in compression of brain and increased pressure
- Injuries can be caused by:
  - Penetrating foreign object
  - Bony skull fragments
  - Brain striking inside of skull from impact

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Brain Injuries (2 of 3) Traumatic Brain Injuries

What to Look For	What to Do
▪ Person looks very drowsy or cannot be awakened ▪ One pupil (the black part in the middle of the eye) that is larger than the other ▪ Seizures ▪ Cannot recognize people or places ▪ Increasing confusion, restlessness, or agitation ▪ Unusual behavior ▪ Is or becomes unresponsive ▪ Headache that gets worse and/or does not go away ▪ Repeated vomiting or nausea ▪ Slurred speech	1. Call 9-1-1. Check for breathing. If breathing is absent, give cardiopulmonary resuscitation (CPR). If breathing is adequate, monitor the person. 2. If a neck injury is suspected, or if the person is unresponsive: • **DO NOT** move the head, neck, or spine. • Tell the person to remain as still as possible. 3. If the person is wearing a helmet, **DO NOT** remove it.

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Brain Injuries (3 of 3) Traumatic Brain Injuries

What to Look For	What to Do
Signs of concussion or mild traumatic brain injury, which may worsen over minutes or hours: *Thinking/remembering symptoms:* ▪ Difficulty thinking clearly ▪ Feeling slowed down ▪ Difficulty concentrating ▪ Difficulty remembering new information *Physical symptoms:* ▪ Headache ▪ Fuzzy or blurred vision ▪ Nausea or vomiting (early on) ▪ Dizziness ▪ Sensitivity to noise or light ▪ Balance problems ▪ Feeling tired, having no energy *Emotional/mood symptoms:* ▪ Irritability ▪ Sadness ▪ More emotional than usual ▪ Nervousness or anxiety *Sleep disturbance symptoms:* ▪ Sleeping more than usual ▪ Sleeping less than usual ▪ Trouble falling asleep	**1.** Call 9-1-1 or seek professional medical care immediately.

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Concussions – MILD Traumatic Brain Injury

Falls are the most common cause of concussions, they are also common in contact sports

What to look for (Thinking / Remembering Symptoms):
a. Difficulty thinking clearly or concentrating
b. Feeling slowed down
c. Difficulty remembering new information

What to look for (Physical Symptoms):
a. Headache
b. Fuzzy or blurred vision
c. Nausea or vomiting (early on)
d. Dizziness
e. Sensitivity to noise or light
f. Balance problems
g. Feeling tired or having no energy
h. One pupil that is larger than the other

What to look for (Emotional/mood symptoms):
a. Irritability
b. Sadness
c. More emotional
d. Nervousness or anxiety

What to look for (Sleep disturbance symptoms):
a. Sleeping more than usual
b. Sleeping less than usual
c. Trouble falling asleep

What to do
a. Stop the activity (if sports related)
b. Do not give painkillers
c. Seek Medical Evaluation

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Scalp Wounds (1 of 3)

- Scalp wounds bleed profusely because scalp has many blood vessels
- Severe scalp wounds may be accompanied by:
  - Concussion
  - Skull fracture
  - Impaled object
  - Brain injury
  - Spinal injury

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Scalp Wounds (2 of 3)

What to Look For	What to Do
Scalp wound	1. Control bleeding by pressing on the wound (**FIGURE 4-27**). Replace any skin flap to its original position and apply pressure. Another option is applying an ice pack or instant cold pack to control bleeding. 2. If you suspect a skull fracture, **DO NOT** apply excessive pressure; doing so may push bone pieces into the brain. Press on the edges of the wound to help control bleeding (**FIGURE 4-28**). 3. Apply a dry, sterile dressing. 4. Keep the head and shoulders raised if no spinal injury is suspected. In cases of suspected spinal injury, keep the person flat on their back and prevent their head and neck from moving. 5. If bleeding continues, remove all but the first blood-soaked dressing and apply a new dressing with well-aimed direct pressure. 6. Call 9-1-1 if any of the following occur: • The wound is extensive. • A skull fracture is suspected. • There is significant facial damage. • Signs of concussion occur.

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Scalp Wounds (3 of 3)

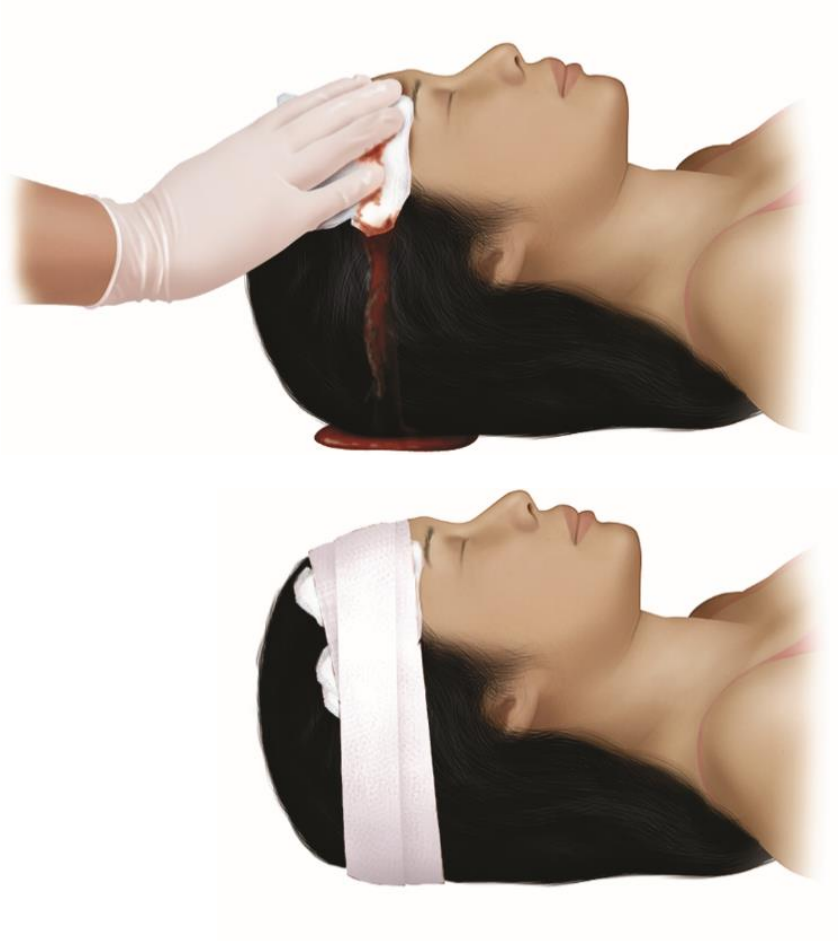


Figure 4-27

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Figure 4-28

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Eye Injuries (1 of 5)

- Seek professional medical care for all eye injuries
- Movement of one eye will result in movement of other
  - Cover both eyes to prevent movement of uninjured eye resulting in movement of injured eye (and possible additional damage)
  - If person cannot tolerate having both eyes covered, cover the injured eye and tell them to keep the uninjured eye closed.

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Eye Injuries (2 of 5)

What to Look For	What to Do
Blow to eye ▪ Person reports being hit by a fist, elbow, ball, or other blunt object	1. Apply an ice pack around the eye for 15 minutes. **DO NOT** place the pack or any pressure on the eye itself. 2. Have the person keep the eyes closed. 3. Seek professional medical care.
Loose object in eye ▪ Severe pain ▪ Tearing (the eye's way of trying to remove the object)	Try, in order, each of the following steps: 1. Have the person blink the eye several times. 2. Using the eyelashes, gently pull the upper eyelid out and over the lower lid. This allows the lower lashes to brush the object off the inside of the upper eyelid. Have the person blink a few times to let the eye move the object out. 3. Gently irrigate the eye with clean, warm water. The unaffected eye should be above the affected eye, to avoid the loose object coming out of the affected eye and falling into the unaffected eye. 4. Examine the lower lid by pulling it down gently. If you see the object, remove it with a wet gauze pad. 5. Have the person look down. Using the eyelashes, lift the eyelid up and over a cotton swab. If an object is seen, remove it with the corner of a wet gauze pad. 6. If successful, professional medical care is usually not needed unless there is continued pain or itching to the eye. If unsuccessful, follow the steps for an object stuck in eye, next.

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Eye Injuries (3 of 5)

What to Look For	What to Do
Object stuck in eye	1. Call 9-1-1. **DO NOT** remove the object. 2. For a long object, place padding around the object to stabilize against movement, and place a paper cup or similar item over the object for protection. 3. For a short object, place a doughnut-shaped pad around the eye, and wrap a bandage around the head without touching the object to hold the pad in place. 4. Cover both eyes; movement of the uninjured eye will cause movement of the injured eye. 5. Keep the person flat on their back.
Cut on the eyeball and/or eyelid	1. Call 9-1-1**. DO NOT** apply pressure to the eye. 2. Cover both eyes with gauze pads, and lightly wrap a bandage around the head to hold the pads in place.
Burns caused by light (from looking at sunlight, welding arc flash, or reflection off of snow or water); these burns may not be painful at first but will become very painful hours later.	1. Cover both eyes with moist, cool cloths. 2. Seek professional medical advice.

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Eye Injuries (4 of 5)

- **Burns caused by light** – Continued:

- What to do

    a. Remove contact lenses

    b. Cover both eyes with moist, cool cloths.

    c. Lubricate with Eye Drops

    d. Rest in the dark

    e. Do not rub the eyes

    F. Seek professional medical care if:

        i. Symptoms last longer than a couple of days

        ii. You experience vision loss, severe eye pain or see halos around lights

        iii. You suspect an infection or have discharge from the eyes.

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Eye Injuries (5 of 5)

What to Look For	What to Do
Eye avulsion, indicated by: ▪ Eye knocked from its socket	1. Call 9-1-1. 2. Cover the eye loosely with a damp, clean dressing. **DO NOT** try to push the eyeball back into the socket. 3. 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. 4. Cover the undamaged eye with a patch to stop movement of the damaged eye.
Chemical, smoke, or other irritant in eye	1. Call 9-1-1. 2. Hold the eye wide open; flush with warm water for at least 15 minutes. • Irrigate from the nose side of the eye toward the outside to avoid flushing the material into the other eye. • Tell the person to roll the eye as much as possible to help wash out the eye. 3. Loosely bandage the eye(s) with a patch to stop movement of the damaged eye.

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Nose Injuries (1 of 3)

- Most nosebleeds are self-limiting, but severe injuries to nose can be frightening
  - Stabilize head and neck if injuries are suspected

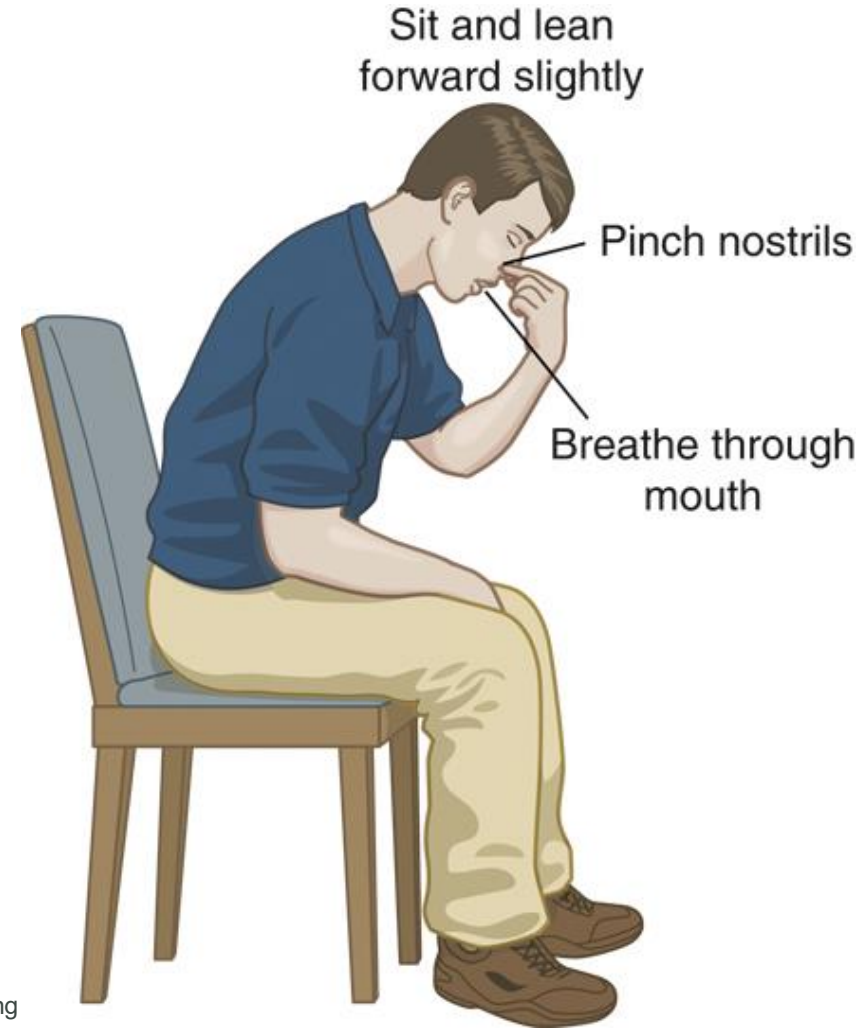


Figure 4-29

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Nose Injuries (2 of 3)

What to Look For	What to Do
Broken nose, indicated by: ▪ Pain, swelling, and a possible crooked appearance ▪ Bleeding and difficulty breathing through the nostrils	1. If bleeding, provide care as you would for a nosebleed. 2. Apply an ice or cold pack for 15 minutes. 3. Seek professional medical care. 4. **DO NOT** try to straighten a crooked nose.
Nosebleed ▪ If the nose was hit, suspect a broken nose that may or may not be deformed. ▪ The 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.	1. Have the person sit leaning slightly forward (**FIGURE 4-29**). **DO NOT** tilt the head back or lie the person down. 2. Pinch the nostrils shut constantly for 10 minutes. Tell the person to breathe through the mouth and not swallow any blood. 3. If bleeding has not stopped, have the person gently sniff or blow their nose to get rid of ineffective blood clots. Pinch the nostrils together again for 10 minutes. 4. If bleeding continues, call 9-1-1.
Foreign object in the nose (a medical condition mainly occurring to small children, who often put peanuts, beans, raisins, and other similar objects into their nostrils)	1. Have the person gently blow their nose while compressing the opposite nostril. 2. If an object is visible, pull it out with tweezers. **DO NOT** push the object deeper. 3. Seek professional medical care if the object cannot be removed.

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Ear Injuries

What to Look For	What to Do
Object(s) stuck in an ear	1. **DO NOT** use tweezers or try to pry an object out. 2. Seek professional medical care to remove the object. In the cases of disc batteries and live insects, call 9-1-1 or go to the nearest emergency department.
Head injuries with fluids coming from the ear (blood or clear fluid draining from the ear may indicate a skull fracture)	1. **DO NOT** attempt to stop flow of blood or clear fluid (known as cerebrospinal fluid), with or without blood, coming from an ear. Doing so could increase pressure on the brain, causing permanent damage. 2. Place a sterile gauze dressing over the ear and loosely bandage it in place to prevent bacteria getting into the brain. 3. Stabilize the head and neck against movement. 4. Call 9-1-1.

For live insects in the ear, mineral oil works much better than water to drown the insect. You can then seek medical attention to make sure the insect had not caused any damage to the ear.

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Tooth Injuries (1 of 3)

- Seek immediate dental care for all dental injuries

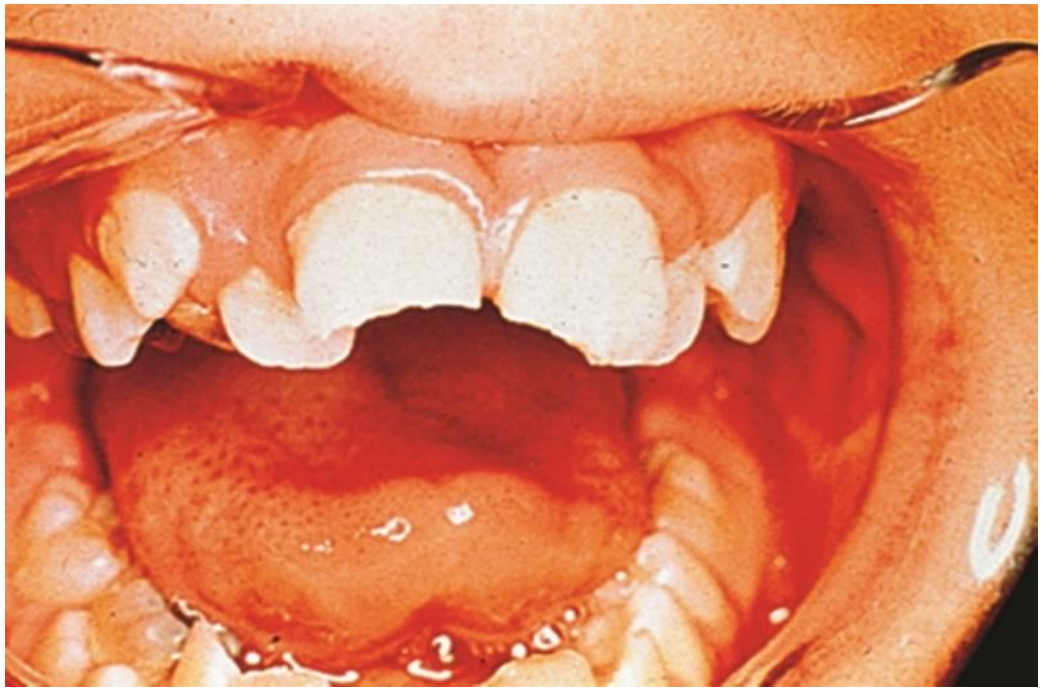


Figure 4-30

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Figure 4-31

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Tooth Injuries (2 of 3)

What to Look For	What to Do
Broken tooth (**FIGURE 4-30**)	1. Collect all tooth or teeth fragments. 2. Seek dental care immediately. 3. Transport the fragments as you would a knocked-out tooth (see the next section).
Knocked-out (avulsed) tooth (**FIGURE 4-31**)	1. Attempt to reimplant the tooth (only if it is a permanent [adult] tooth): • Hold the tooth by the crown (tooth part normally seen when looking into a mouth). **DO NOT** touch the root. • If the tooth is dirty, gently rinse it in a bowl of warm water. **DO NOT** scrub or remove any of the attached tissue fragments. • Gently push the tooth down into the socket so the top is even with the adjacent teeth. The person can bite down gently on gauze or a handkerchief placed between the teeth. 2. If unable to reimplant the tooth, control bleeding in the socket (place a dressing in the socket and apply pressure) and keep the knocked-out tooth viable by storing it in cow's milk, clear plastic wrap, or the person's own saliva. 3. Seek immediate dental care.

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Tooth Injuries (3 of 3)

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.

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Spinal Injuries (1 of 2)

- Include damage to neck, back, hip, or pelvis
- Suspect in automotive crashes, falls, diving incidents, and blows to the head
- Be careful not to move head/neck; have second first aid provider hold head to minimize movement



Figure 4-32

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Spinal Injuries (2 of 2)

What to Look For	What to Do
An alert person with signs of spinal injury: Reports of back pain and leg numbness and tingling	1. Call 9-1-1. **DO NOT** attempt to move the person. Wait for trained rescuers with proper equipment to move the person. **DO NOT** apply a cervical (neck) collar. Leave the person in the position in which found. Tell the person to remain as still as possible. 2. Cover with a blanket or coat to prevent heat loss.
An unresponsive person who sustained one of the injuries listed	1. Call 9-1-1. 2. **DO NOT** attempt to move the person. Leave the person in the position in which they were found. Consider moving only for the following: to provide CPR, to control life-threatening bleeding, or to move to a safe location. 3. If the person is breathing normally, hold their head in the neutral (eyes straight ahead) position to maintain alignment and prevent movement until EMS arrives. **DO NOT** use the recovery position if a spinal injury is suspected. 4. If the person is not breathing, begin CPR using the jaw-thrust maneuver to open the airway.

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Chest Injuries

Trauma is not fixed in the field, it is fixed in the hospital”

What to Look For	What to Do
Fractured or broken or rib, indicated by: ▪ Sharp pain when the person takes deep breaths, coughs, or moves ▪ Guarding (tensing muscles around the injury to help protect the area) ▪ Tenderness ▪ Shallow breathing due to pain that occurs from normal or deep breathing ▪ Bruising of skin over the injury (usually occurs along the side of the chest)	1. Call 9-1-1 or take the person to a hospital emergency department. 2. Help the person find a comfortable position. 3. Stabilize the chest by: • Having the person hold a pillow or other similarly soft material against the area, or • Placing the arm on the injured side in a sling and binder (swathe) if necessary for pain control. 4. **DO NOT** apply tight bandages around the chest.
Impaled object or object in the chest (usually easy to see)	1. Call 9-1-1. 2. Stabilize the object in place with bulky dressings. **DO NOT** try to remove the object.
Open chest wound, indicated by: ▪ Blood bubbling out of a chest wound during exhalation ▪ Sucking sound heard during inhalations	1. Call 9-1-1. 2. If bleeding does not occur, leave the wound exposed to air without a dressing or any airtight material. 3. If bleeding occurs, apply direct pressure with a dry gauze dressing to control bleeding. If the dressing becomes blood-soaked, replace it to avoid trapping air in the chest, which can result in death.

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Chest Injuries - Continued

- A **pneumothorax** is a collapsed lung where air leaks into the space between the lung and chest wall.

- A **tension pneumothorax** is a life-threatening variant where air acts as a "one-way valve," getting trapped and continually building up pressure, which critically collapses the lung and pushes on the heart.

- Pneumothorax / Tension Pneumothorax (collapsed lung). Can be caused by:
    a. Pressure on lung from the blunt force
    b. Broken rib puncturing the plural space
    c. Open chest wound (impaled object, stabbing, gunshot wound)

- ***Using a manufactured Vented Chest Seal on an "Open Chest Wound" can reduce the risk of Tension Pneumothorax.***

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Abdominal Injuries (1 of 4)

- Injury below chest near stomach and other organs
- DO NOT give anything to eat or drink to a person with an abdominal injury
- Place on back with knees bent and treat for shock

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Abdominal Injuries (2 of 4)

What to Look For	What to Do
Impaled object (eg, knife, stick, or other sharp object)	1. Call 9-1-1. 2. Stabilize the object against movement by placing bulky dressing or packing around it. **DO NOT** remove an impaled object.
Internal organs protruding from the wound	1. Call 9-1-1. 2. Place the person on their back with legs pulled up (flexed) toward their abdomen. 3. Cover the organs with a moist, clean dressing (**FIGURE 4-33**). Loosely tape the dressing in place. **DO NOT** try to push protruding organs back in, **DO NOT** touch organs, and **DO NOT** apply any material that clings or disintegrates when wet.

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Abdominal Injuries (3 of 4)



Figure 4-33

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Abdominal Injuries (4 of 4)

What to Look For	What to Do
Hard blow to abdomen Signs of possible internal injuries, including: ▪ Pain that gradually increases and may become severe ▪ Pain that markedly increases with slight movements ▪ Abdomen is very tender to touch ▪ Blood in vomit, urine, or bowel movement ▪ Bruising or other marks on the abdominal skin	1. Call 9-1-1. 2. Place the person onto one side with legs bent and expect vomiting. 3. **DO NOT** give the person anything to eat or drink.

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Musculoskeletal Injuries (1 of 8)

- Rarely life threatening, but open fractures and femur fractures can result in significant blood loss
- Types (difficult to differentiate without imaging)
  - **Contusions** – (bruises) bleeding beneath the skin
  - **Strains** – muscle tears when stretched beyond the normal range
  - **Sprains** – tearing or stretching of a ligament (ligaments connect bones to bones)
  - **Dislocations** – bones displaced from their normal joint alignment
  - **Fractures** – breaks or cracks in the bone

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Musculoskeletal Injuries (2 of 8)

- RICE procedure
  - R = Rest
  - I = Ice
  - C = Compression
  - E = Elevation

  First 24-48 hours

MEAT procedure

- M = Movement
- E = Exercise
- A = Analgesics
- T = Treatment (physical therapy)

After 24-48 hours

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Musculoskeletal Injuries (3 of 8)

- Fractures and dislocations should be stabilized before moving person
- Types of splints
  - Rigid splint
  - Soft splint







Figure 4-34 (left)
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Figure 4-35 (right)
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Musculoskeletal Injuries (4 of 8)

- Types of splints (cont'd)
  - Self-splint (injured part tied to uninjured part)



Figure 4-36

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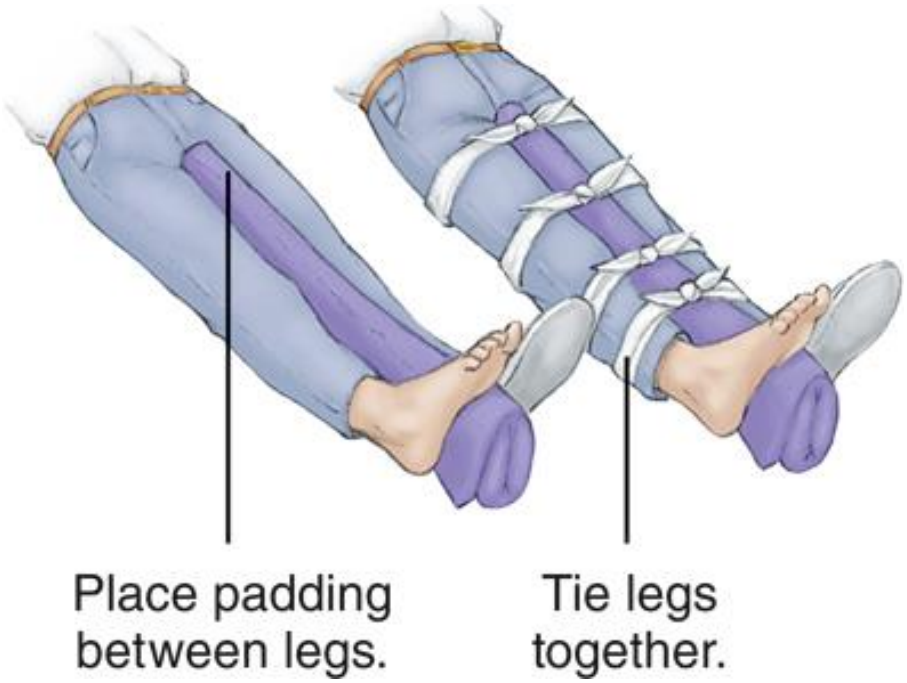


Figure 4-37

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Figure 4-38

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Musculoskeletal Injuries (5 of 8)

- To apply splint
  - Dress open wounds
  - Apply splints firmly, but not tightly enough to affect blood flow
  - Pad with clothing or other soft materials for comfort
  - Use arm sling and binder with broken arm

  - **For a bone**, splint the joint above and below the bone
  - **For a joint**, splint the bone above and below the joint

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Musculoskeletal Injuries (6 of 8)

- Joint injuries (dislocations)
  - Occurs when a joint comes apart and stays apart
  - Relocation is NOT part of standard first aid



Figure 4-39

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Figure 4-40

© American Academy of Orthopaedic Surgeons



Figure 4-41

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Musculoskeletal Injuries (7 of 8)

What to Look For	What to Do
Dislocation ■ Front of the shoulder (anterior; accounts for 95% of all shoulder dislocations; **FIGURE 4-39**) • Inability to touch the opposite shoulder with the hand of the injured arm • Arm is held away from the body • Deformity compared to opposite shoulder • Extreme pain ■ Patella (kneecap; **FIGURE 4-40**) • The kneecap has moved to the outside of the knee joint (large bulge seen under the skin) • Deformity compared with opposite kneecap • Extreme pain ■ Finger (**FIGURE 4-41**) • Deformity compared with the finger on the opposite hand • Inability to use	1. Call 9-1-1 or seek professional medical care. 2. The injured body part can be held while transporting to a medical facility or until EMS arrives. 3. **DO NOT** try to reduce or reset a dislocation. 4. If bleeding from an open wound is at the injured area: • Control bleeding by applying pressure on the wound edges. • **DO NOT** push on the bone.

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Musculoskeletal Injuries (8 of 8)

Sprains

- Joint is twisted or stretched beyond normal range of motion and **ligaments** are partially or completely torn

What to Look For	What to Do
It is often difficult to distinguish between a severe sprain and a fracture because their signs and symptoms are similar. ▪ Pain may prevent the person from moving or using the joint ▪ Swelling ▪ Discolored skin around the joint resulting from bleeding from torn blood vessels	1. Most sprains do not require medical care. If recuperation seems long, consult a physician. 2. Use the RICE procedure.

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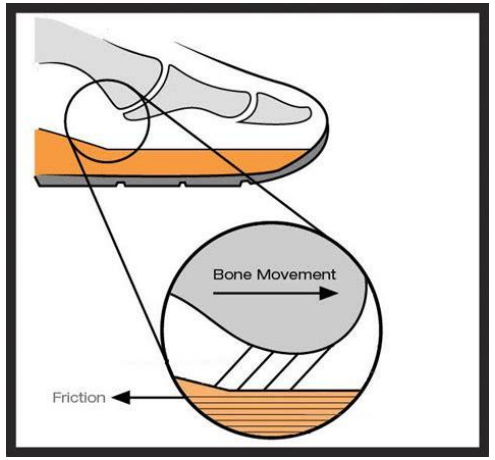
Blisters (1 of 3)

Treatment of Blisters

• **Hot Spots:** Immediately cover any “hot spots” as they appear using products such as paper tape, Leuko Tape or Hypafix (preferable due to the thinness of the tape).

- Round the corners of the tape to reduce pressure on the edges.

- Do not use duct tape as it is very thick and tends to “bunch up” causing more friction and shear (see photo below).





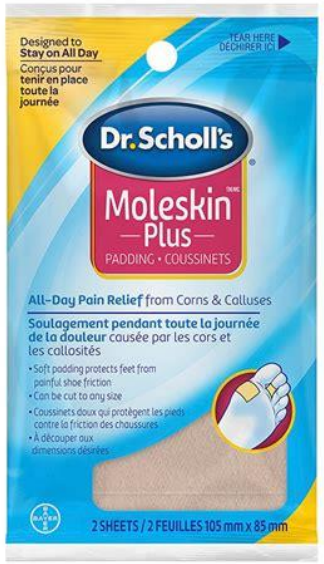




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Blisters (2 of 3)

- **Intact Blister:** Do not de-roof an intact blister. <u>Use a sterilized safety pin to drain the fluid.</u>
- Use Moleskin (cut like a donut), to surround the blister (not on it), to create cushioning around the blister.
- *Orthopedic felt* is an alternative to Moleskin







A shoe manufactured with a wide toe box, not necessarily a wide shoe, can help prevent blisters from toes rubbing against toes.

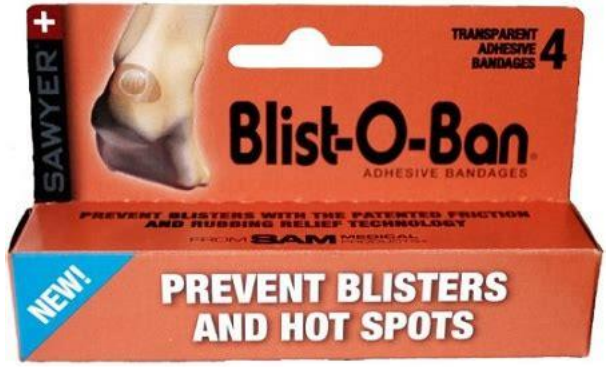
Some manufacturers with wide toe boxes: Topo, Altra, Keen, Lems, Xero…and more

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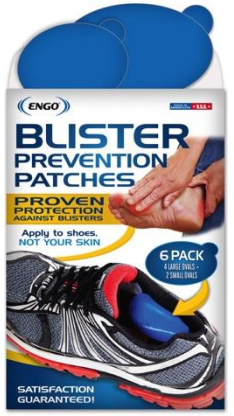
Blisters (3 of 3)

- **Ulcerated Blister (torn roof):** Trim the skin to smooth out the area. Place a small amount of antibiotic ointment directly on the exposed skin.
- Cover the blister with products such as 2nd skin or Blist-O-Ban. Both provide a very good cushion to protect the exposed area.
- For toes, use toe sleeves to cover the blister. Toe sleeves can also be used for hot spots on toes as well as to cover intact blisters on toes, as it is sometimes difficult to tape toes.









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