

8 Bone, Joint, and Muscle Injuries

CHAPTER PREVIEW

- Fractures
- Joint Injuries
- Muscle Injuries
- RICE
- Splinting the Extremities

Injuries of the bones, joints, and muscles are among the most common injuries both at work and in the home. Fractures are generally the most serious, although dislocations and sprains can also be very serious. Fortunately, most musculoskeletal injuries do not involve fractures or dislocations (**Figure 8-1**).

FRACTURES

A **fracture** is a broken bone. The bone may be completely broken with the pieces separated, or it may be only cracked. With a **closed fracture** the

skin is not broken. With an **open fracture** there is an open wound at the fracture site, and bone may protrude through the wound (**Figure 8-2**). Bleeding can be severe with fractures of large bones, and organs nearby may also be injured.

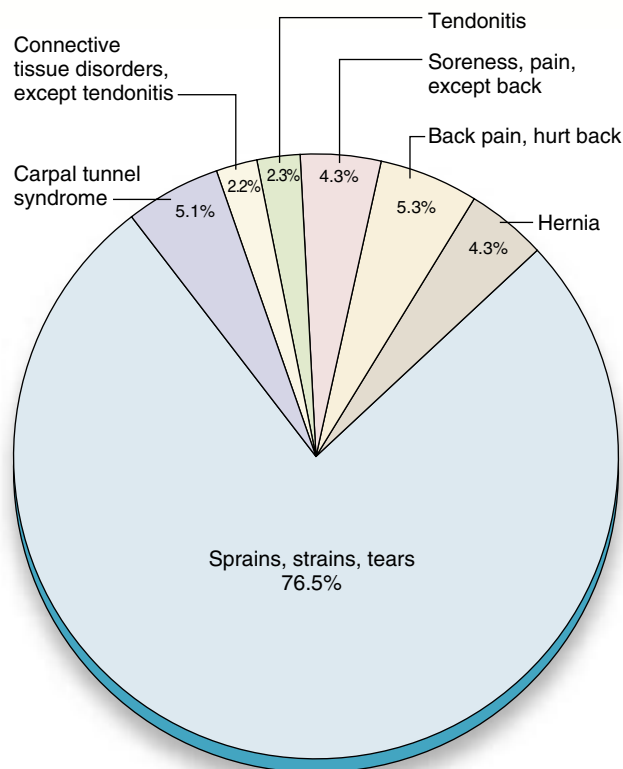


Figure 8-1 Musculoskeletal disorders causing days away from work by nature of injury or illness. *Source:* U.S. Department of Labor, Bureau of Labor Statistics. Survey of Occupational Injuries and Illnesses, 2001.

When You See

- A deformed body part (compare to other side of body) (**Figure 8-3**)
- Signs of pain
- Swelling, discoloration of skin
- Inability to use the body part
- Bone exposed in a wound
- Victim heard or felt a bone snap
- Possible signs and symptoms of shock

Do This First

1. Have the victim rest and immobilize the area. With an extremity, also immobilize the joints above and below the fracture.
2. Call 911 for a large bone fracture. A victim with a fractured hand or foot may be transported to the emergency room.
3. With an open fracture, cover the wound with a dressing and apply gentle pressure around the fracture area only if needed to control bleeding.
4. Put ice or a cold pack on the area.



Figure 8-2 Closed and open fractures.

- If help may be delayed or if the victim is to be transported, use a splint to keep the area immobilized (see later section on splints). Elevate a splinted arm.

Additional Care

- Treat the victim for shock
- Monitor the victim's ABCs
- Remove clothing and jewelry if they may cut off circulation as swelling occurs



Do not try to align the ends of a broken bone.
Do not give the victim anything to eat or drink.

JOINT INJURIES

Injuries to joints include dislocations and sprains. In a **dislocation**, one or more bones have been moved out of the normal position in a joint. A **sprain** is an injury to ligaments and other structures in a joint. Both kinds of joint injuries often look similar to a fracture.

Dislocations

It is not always possible to tell a dislocation from a closed fracture, but the first aid is very similar.

When You See

- The joint is deformed (compare to other side of body)
- Signs of pain
- Swelling
- Inability to use the body part

Do This First

1. Have the victim rest and immobilize the area in the position in which you find it (Figure 8-4).
2. Call 911. A victim with a dislocated bone in the hand or foot may be transported to the emergency room.

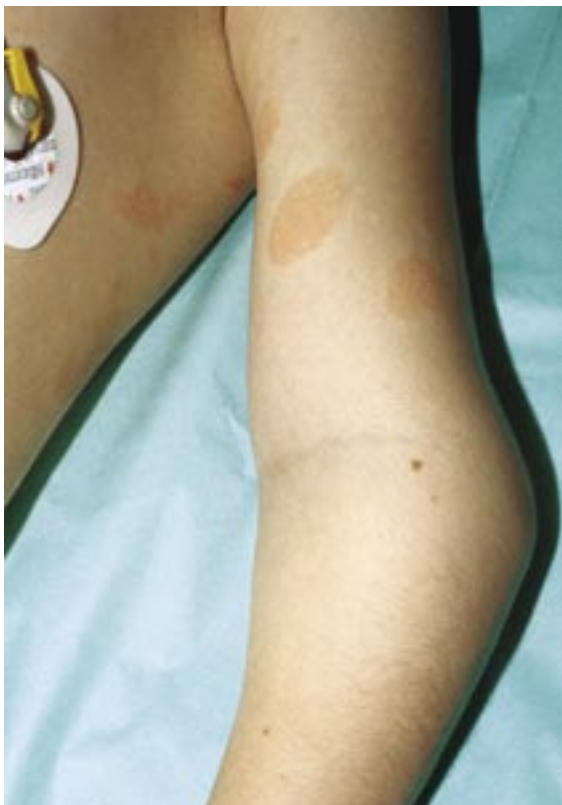


Figure 8-3 An obvious deformity may indicate a fracture.



Figure 8-4 Immobilize and support a dislocated shoulder.

3. Put ice or a cold pack on the area.
4. If help may be delayed or if the victim is to be transported, use a splint to keep the area immobilized (see later section on splints).

Additional Care

- Treat the victim for shock
- Monitor the victim's ABCs
- Remove clothing and jewelry if they may cut off circulation as swelling occurs



Dislocation

Do not try to put the displaced bone back in place.
Do not let the victim eat or drink.

Sprains

Sprains can range from mild to severe. It may be difficult to tell a severe sprain from a fracture, but the first aid is similar for both. The ankles, knees, wrists, and fingers are the body parts most often sprained.

When You See

- Signs of pain
- Swollen joint

- Bruising of joint area
- Inability to use joint

Do This First

1. Have the victim rest and immobilize the area in the position in which you find it.
2. Put ice or a cold pack on the area and then wrap joint with a compression bandage (**Figure 8-5**).
3. Use a soft splint (bandage, pillow, blanket) to immobilize and support the joint.
4. Elevate a sprained hand or ankle above the level of the heart (**Figure 8-6**).
5. Seek medical attention.

Additional Care

- Remove clothing or jewelry if they may cut off circulation as swelling occurs



Figure 8-5 Put ice or a cold pack on the area.



Figure 8-6 Put a compression bandage on a sprain and elevate.

Learning Checkpoint 1

1. True or False: Call 911 for a fracture of a large bone such as the thigh bone.
2. When immobilizing a fracture injury, what body area should be immobilized?
 - a. The immediate fracture area
 - b. The fracture area and the joint above it
 - c. The fracture area and both the joints above and below it
 - d. The entire victim
3. True or False: With a fracture, you may also need to treat the victim for shock.
4. The signs and symptoms of a bone or joint injury include which of the following? (Check all that apply.)

<input type="checkbox"/> Deformed area	<input type="checkbox"/> Pain
<input type="checkbox"/> Small or unequal pupils	<input type="checkbox"/> Inability to use part
<input type="checkbox"/> Skin is hot and red	<input type="checkbox"/> Fever
<input type="checkbox"/> Swelling	<input type="checkbox"/> Spasms and jerking of nearby muscles
5. True or False: A victim with a sprained ankle should “walk it off.”

REMOVING A RING

When an injury to the hand or fingers causes swelling, the victim’s watch or rings can cut off circulation. Try to remove a watch and rings before swelling occurs. Removal of a ring is easier if you first soak the finger in cold water or wrap it in a cold pack and then put oil or butter on the finger.

MUSCLE INJURIES

Common muscle injuries include strains, contusions, and cramps. These injuries are usually less serious than bone and joint injuries.

Strains

A **strain** is a tearing of the muscle caused by overexerting or “pulling” a muscle. Back strains are common occupational injuries.

When You See

- Signs of dull or sharp pain when muscle is used
- Stiffness of the area
- Weakness or inability to use the muscle normally

Do This First

1. Rest the muscle.
2. Put ice or a cold pack on the area: 30 minutes on, then at least 30 minutes off.
3. With an extremity, wrap a compression bandage around the muscle.
4. Elevate the limb.

Additional Care

- Seek medical attention if pain is severe or persists

Contusions

A **contusion** is a bruised muscle as may result from a blow.

When You See

- Signs of pain
- Swollen, tender area
- Skin discoloration (black and blue)

Do This First

1. Rest the muscle.
2. Put ice or a cold pack on the area: 30 minutes on, then at least 30 minutes off.
3. With an extremity, wrap a compression bandage around the muscle.
4. Elevate the limb.

Additional Care

- Seek medical attention if pain is severe or persists

Cramps

A **muscle cramp** is a tightening of a muscle usually because of prolonged use. Cramps are common in the legs, stomach, back, or any muscle that is overused. These cramps are different from heat cramps, which result from fluid loss in hot environments (see Chapter 11).

When You See

- Signs of muscle pain and tightness

Do This First

1. Gently stretch out the muscle if possible.
2. Massage the muscle.

Additional Care

- Drink plenty of fluids

RICE

The RICE acronym is an easy way to remember how to treat all bone, joint, and muscle injuries. With this procedure you do not have to know whether the injury is a fracture, dislocation, sprain, or strain as they are treated in the same manner.

R = Rest

I = Ice

C = Compression

E = Elevation

Rest

Any movement of a musculoskeletal injury can cause further injury, pain, and swelling. Have the victim rest until medical help arrives. Rest is also important for healing.

Learning Checkpoint 2

1. True or False: For a muscle strain, keep an ice pack on the injury for at least 2 hours.
 2. True or False: Vigorous massage is the best treatment for a muscle contusion.
 3. True or False: You can tell a contusion from a fracture because only a contusion causes an area of skin discoloration.
 4. Name two things you can do to ease a muscle cramp.
-

Perform the Skill

RICE Procedure for a Wrist Injury



1 Rest the injured wrist.



2 Put ice or cold pack on the injured area.



3 Compress the injured area with an elastic roller bandage.



4 Elevate the injured area. Use a sling wrist in place.

Ice

Cold reduces swelling, lessens pain, and minimizes bruising. Put ice or a cold pack on the injury (except for an open fracture) as soon as possible. Cubed or crushed ice in a plastic bag, or an improvised cold pack such as a bag of frozen peas or a cloth pad soaked in cold water, can be applied directly on the injured area. A commercial cold pack should be wrapped in cloth to prevent direct

skin contact because it may be cold enough to freeze the skin.

Cold works best if applied to the injury as soon as possible, preferably within 10 minutes. Apply it for 30 minutes on and 30 minutes off for the first few hours, then for 20 to 30 minutes at a time every 2 or 3 hours for the first 24 to 48 hours, or for 72 hours for severe injuries.



(a) Rigid splint.



(b) Soft splint.



(c) Anatomic splint.

Figure 8-7 Examples of splints.

Compression

Compression of an injured extremity is done with an elastic roller bandage. Compression helps prevent internal bleeding and swelling. Wrap the bandage over the injured area. It can also be used around a cold pack. Check the fingers or toes frequently to make sure circulation is not cut off.

Elevation

Elevating an injured arm or leg also helps prevent swelling and control internal or external bleeding. Splint a fracture first, and elevate it only if moving the limb does not cause pain.

SPLINTING THE EXTREMITIES

When a victim has a fracture, dislocation, or sprain in an arm or leg, the arm or leg may be splinted if the victim is at risk for moving the

injured area unless help is expected within a few minutes. Always splint an extremity before transporting the victim to a healthcare provider or emergency room. Splinting helps prevent further injury, reduces pain, and minimizes bleeding and swelling.

Types of Splints

Splints can be made from many different materials at hand. There are three types of splints (**Figure 8-7**):

- **Rigid splints** may be made from a board, a piece of plastic or metal, a rolled newspaper or magazine, or thick cardboard.
- **Soft splints** may be made from a pillow, folded blanket or towel, or a triangular bandage folded into a sling.
- **Anatomic splints** involve splinting an injured leg to the uninjured leg or splinting fingers together.

Splints can be tied in place with bandages, belts, neckties, or strips of cloth torn from clothing.

Guidelines for Splinting

- Put a dressing on any open wound before splinting the area
- Splint only if it does not cause more pain for the victim
- Splint the injury in the position you find it (**Figure 8-8**)
- Splint to immobilize the entire area. With an extremity, splint the joints above and below the injured area
- Put padding such as cloth between the splint and the victim's skin
- Put splints on both sides of a fractured bone if possible
- Elevate the splinted extremity if possible
- Apply a cold pack to the injury around the splint

- With a splinted extremity, check the fingers or toes frequently to make sure circulation is not cut off. Swelling, bluish discoloration, tingling or numbness, and cold skin are signs and symptoms of reduced circulation. If any of these are noted, the splint should be removed.

Follow the steps shown in the following skill examples to splint an arm or leg. After splinting an arm, secure with a sling and binder. A sling supports and elevates an injury of the hand or forearm. A sling may also be used to minimize movement and support the area with a shoulder dislocation or rib fracture. A leg fracture can be splinted using either a rigid splint or an anatomic splint (as shown in the example). The example shows splinting of a lower leg fracture. A similar splint can be used for an upper leg fracture, with the bandages tied higher (including the hips).



Figure 8-8 Splint an injury in the position found, such as this elbow fracture and knee injury. Do not try to straighten the limb to splint it.

Perform the Skill

Splinting an Arm



Support above and below injury

1 Support the arm.



Pad the splint

2 Position the arm on a rigid splint.



3 Secure the splint.

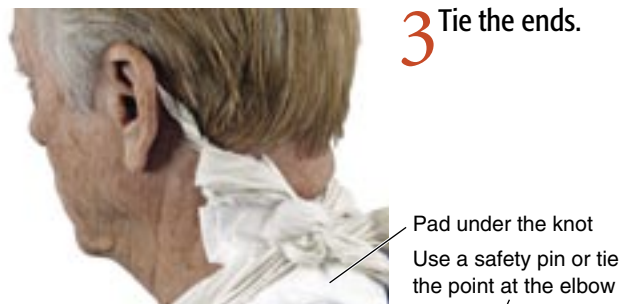


Check for tingling, numbness, swelling, or cold skin

4 Check circulation.

Perform the Skill

Making an Arm Sling and Binder



4 Secure the point of the bandage at the elbow.

5 Tie a binder bandage over the sling and around the chest.

Perform the Skill

Splinting a Leg



1 Gently slide 4 or 5 bandages or strips of cloth under both legs.

3 Gently slide the uninjured leg next to the injured leg.



2 Put padding between the legs.



4 Tie the bandages.

Learning Checkpoint 3

1. Use RICE for:
 - a. Most musculoskeletal injuries
 - b. Fractures only
 - c. Muscle injuries only
 - d. Muscle and joint injuries only
2. True or False: Putting a cold pack directly on the skin is the best way to relieve pain and reduce swelling.
3. What is important about how you apply a compression bandage?
 - a. Use elastic roller bandage
 - b. Put the cold pack under the bandage if needed
 - c. Check that circulation is not cut off
 - d. All of the above
4. Describe the steps you would follow to use RICE for a fractured or sprained ankle.

5. You encounter a victim with an obviously fractured forearm. What materials might you be able to find in your own work site that you can use to make a rigid splint?

6. When using a splint, which of the following are actions you should take? (Check all that apply.)
 Put a heating pad on the area Pad the splint
 Straighten out a limb before splinting it Put a cold pack around splint
 Dress an open wound before splinting Splint in position found
7. You are called to the scene where a coworker is lying on the ground with obvious severe pain in one leg after a piece of equipment fell on it. You cannot tell whether the bone is broken, but there is no open wound and the victim says it really hurts to move the leg. What should you do?
