CHAPTER 14

Bone, Joint and Muscle Injuries

Video – Bone, Joint & Muscle
Lesson Objectives

1. Describe ways to prevent common sports and recreation injuries.
2. Explain what to look for when assessing musculoskeletal injuries.
3. Demonstrate how to use RICE to care for a musculoskeletal injury.
4. Describe the first aid for fractures, dislocations and sprains.
5. Explain the difference among strains, contusions and cramps and describe the first aid for each.
Injuries of the Bones, Joints and Muscles

• Among most common injuries
• May result from blow, impact against something or other forces
• Most sports injuries are musculoskeletal injuries
Classification of Musculoskeletal Injuries

- Fractures
- Dislocations
- Sprains
- Strains
- Contusions
- Cramps
Prevention of Sports and Recreation Injuries

- Wear and correctly use sports equipment.
- Follow safety guidelines for sports.
- Check with health care provider before beginning new activity.
- Maintain healthy, well-balanced diet.
- Maintain healthy weight.
- Prevent falls.
Prevention of Sports and Recreation Injuries

continued

- Wear proper shoes, shoes that fit.
- Do daily stretching exercises.
- Warm up/stretch before activity.
- Stay hydrated.
- Avoid exercising or sports when tired or in pain.
- Run on even surfaces.
Assessing Musculoskeletal Injuries

• Do initial assessment:
  • Care for any life-threatening conditions
  • Perform physical examination.
• Consider mechanism of injury:
  • Consider possible spinal injury
• Ask responsive victim for history.
• Do not move victim unnecessarily.
Signs and Symptoms of Injury

- Comparison of injured arm or leg to opposite one
- Pain when area touched
- Bleeding or other wounds
Signs and Symptoms of Injury continued

- Discoloration
- Open wound (injury site)
- Deformity (injury site)
- Swelling
Signs and Symptoms of Injury continued

- Abnormal sensation (numbness, tingling)
- Inability to move area
- Difference in temperature
During the Physical Examination

- Carefully remove victim’s clothes, as needed.
- Do not assume less painful injuries are minor.
- Do not ask victim to move injured area if it causes pain.
- Lack of sensation may be symptom of serious injury (nerve damage).
Swelling usually occurs but amount of swelling not a good indicator of severity.

Obvious deformity usually sign of dislocation or fracture.

Skin discoloration may resemble bruising.

Pale, bluish skin color and cool skin may indicate lack of blood flow to area (serious injury).
General First Aid for All Musculoskeletal Injuries

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Rest

- Any movement can cause further injury, pain, swelling.
- Have victim rest until medical help arrives.
- If medical care delayed or victim must be moved, use a splint to immobilize area.
Ice

- Cold reduces swelling, lessens pain and minimizes bruising.
- Put ice or cold pack on injury (except open fracture) as soon as possible.
- Plastic bag with ice-water mix is preferred; commercial cold pack can be used.
- Put damp cloth barrier between cold and skin.
- Apply for 20 minutes (or 10 minutes if it produces discomfort), then remove for 30 minutes.
Compression

- Compression provides comfort and support.
- May help prevent internal bleeding and swelling.
- Use elastic bandage.
- Wrap bandage over injured area or over cold/ice pack; remove the bandage just long enough to remove cold pack after 20 minutes.
- Check circulation in fingers and toes.
- Can be used 24-48 hours if not too tight.
Elevation

- Elevation helps prevent swelling and control internal or external bleeding.
- Splint fracture first and elevate it only if moving limb does not cause pain.
Skill: Applying a Spiral Bandage

1. Anchor starting end of the elastic bandage below the injured area, farther from the trunk.
2. Wrap the bandage in spirals up the limb toward the center of the body.
3. Secure the end of the bandage with clips or tape.
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Skill: Applying a Figure-8 Bandage to the Wrist
Skill: Applying a Figure-8 Bandage to the Wrist

1. Anchor the starting end of the roller bandage.

2. Turn the bandage diagonally across the wrist and back around the hand (forming a figure 8).

3. Continue overlapping the turns by about ¾ of the previous turn.

4. Secure the end of the bandage with clips or tape.
Applying a Figure-8 Bandage to the Ankle

1. Anchor the starting end of the bandage.
2. Turn the bandage diagonally across the top of foot and around the ankle, and bring the bandage around in a figure 8.
3. Continue with overlapping figure-8 turns by about \( \frac{3}{4} \) of the previous turn.
4. Secure the end of the bandage with clips or tape.
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Skill: RICE for Wrist Injury
Skill: RICE for Wrist Injury

1. Rest the injured wrist.
Skill: RICE for Wrist Injury  continued

2. Put ice or a cold pack on the injured area.
Skill: RICE for Wrist Injury continued

3. Compress the injured area with an elastic bandage.
Skill: RICE for Wrist Injury  
continued

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

- Bone may be completely broken or only cracked:
  - Closed fracture – skin not broken
  - Open fracture – open wound at site
- Bleeding can be severe with fracture of large bones.
- Nearby organs may be damaged.
- Assess circulation: Call 9-1-1 if compromised.
Fractures continued

- **Transverse**: The fracture line crosses the bone at a right angle.
- **Greenstick**: An incomplete fracture and bending of bone that is more likely in children whose bones are soft.
- **Comminuted fracture**: The bone is broken into more than two fragments.
- **Hairline fracture**: The bone fragments do not separate.
- **Impacted**: One fragment is driven into the bone of the other fragment.
First Aid: Fractures

1. Immobilize area (joints above and below).
2. Call 9-1-1 or transport.
3. Treat open wound.
4. Apply RICE.
5. Splint if help delayed.
Joint Injuries: Dislocation

• One or more bones moved out of normal position in joint

• Usually involves tearing of ligaments or other joint structures
Joint Injuries: Sprain

- Bones remain in place in joint but ligaments and other structures are injured.
Joint Injuries

- Dislocations and sprains can look similar to fractures and may be just as serious.
- When in doubt – treat as severe and call 9-1-1.
Dislocations

- Typically result from strong forces
- Sometimes accompanied by fractures or other serious injuries
- Pain, swelling, bruising occur
- Significant displacement can damage nearby nerves and cause serious bleeding.
Dislocations continued

- Joint or limb may look deformed.
- Can be serious because of potential for nerve and blood vessel injury.
- With severe bleeding, victim may go into shock.
- Check and care for life-threatening conditions first – then care for dislocation.
Dislocations continued

Normal joint

Anterior dislocation of the humerus
First Aid: Dislocation

1. Immobilize area.
2. Call 9-1-1.
3. Apply RICE.
4. Splint if help delayed.
Sprains

• Typically occur when joint is overextended.
• Ankles, knees, wrists, fingers are most common.
• Cause swelling, pain, bruising and inability to use joint.
• Difficult to tell severe sprain from fracture.
• Assess circulation: If compromised – call 9-1-1.
First Aid: Sprains

1. Immobilize area.
2. Apply RICE.
3. Use soft splint to immobilize joint.
4. Seek medical attention.
When to See Health Care Provider for a Musculoskeletal Injury

- Signs and symptoms of fracture or dislocation
- Injury causes severe pain
- Cannot walk
- Tenderness or numbness
- Injured area looks different than other extremity
- Injured joint cannot move
- Redness or red streaks from injured area
- Area has been injured before
- If you are unsure of seriousness or treatment
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Removing a Ring

• Jewelry can cut off circulation with swelling.
• Try to remove before swelling occurs.
• To remove ring:
  • Soak finger in cold water or wrap in cold pack.
  • Put oil or butter on finger.
Muscle Injuries

- Typically caused by overexertion, careless or sudden movement, poor body mechanics.
- Common injuries include strains, contusions and cramps.
- Usually less serious than bone and joint injuries.
- Repeated injury can lead to chronic problem.
Strains

• **Tearing of muscle or tendon.**
• Occurs when muscle stretched too far by overexerting.
• Causes pain, swelling and sometimes inability to use muscle.
• Can be prevented by avoiding overexertion, good body mechanics, sports safety.
First Aid: Strains

1. Apply RICE.

2. Keep cold pack on area for 20 minutes (or 10 minutes if it produces discomfort), then at least 30 minutes off; reapply for 20 (or 10) minutes, then remove again for 30 minutes.
Contusions

- Bruised muscle
- May result from a blow:
  - Occurs when muscle compressed between object causing blow and underlying bone.
- Cause pain, swelling and discoloration:
  - May persist up to a month.
First Aid: Contusion

1. First treat any injury that caused the bruising.
2. Apply RICE. Do not massage the muscle.
3. Keep the cold pack on the area for 20 minutes (or 10 minutes if it produces discomfort), then remove it for 30 minutes. Repeat the process for 24-48 hours as needed.
Muscle Cramps

- Tightening of muscle
- Usually occurs from prolonged use but may have no apparent cause
  - Most common in thigh and calf muscle
  - Different from heat cramps
  - May last a few seconds to 15 minutes
  - May be prevented with flexibility exercises and stretches
First Aid: Muscle Cramp

1. Have the victim stop the activity.
2. Gently stretch out the muscle, if possible.
3. Gently massage the muscle after active cramping stops, if this provides relief.
4. Place a cold pack on the area for 20 minutes (or 10 minutes if it produces discomfort), then remove it for 30 minutes.
Chapter – Opening Scenario

On a Saturday morning you are jogging the trail through a local park when you see a woman jogging some distance in front of you suddenly tumble to the ground. When you reach her, she is holding her ankle, which she says really hurts. She says she came down on the side of her foot and felt her ankle twist. She thinks it is sprained but she doesn’t know what to do.

How can you help?
CHAPTER 14
Critical Thinking Challenge Questions
Scenario 1

An employee riding his bicycle to work hits a pothole as he enters the parking lot, loses control and swerves into the path of a moving pickup truck. The truck’s bumper strikes his leg below the knee. By the time you reach the scene, the victim has been helped into a position lying down. He is responsive but in significant pain. You carefully cut open his pant leg and see an open wound that is bleeding, in which you can see the end of a broken bone.

Describe what care to give.
Scenario 2

A worker has been carrying heavy equipment and supplies all morning to a construction site, and he now stumbles and falls. He says the muscle in his leg is “all cramped up” and really hurts when he walks on that leg. You see no sign of a fracture or other serious injury.

What should you do?
Scenario 3

While using a long pole to sweep leaves from a low roof, your neighbor twists her arm. She says her elbow hurts, but she can move it. There is some swelling, but no distortion suggesting a fracture or serious sprain.

What care do you give?
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Discussion and Questions