Musculoskeletal Injuries

♦ KNOWLEDGE OBJECTIVES

1. Identify the four main structures of the musculoskeletal system.

2. List five common signs or symptoms of musculoskeletal injuries.

3. List seven signs and symptoms that would cause you to suspect a serious musculoskeletal injury.

4. Describe how to care for musculoskeletal injuries.

5. List four principles of splinting.

6. Identify three types of splints.

7. Define the key terms for this chapter.

♦ SKILL OBJECTIVES

After reading this chapter and completing the class activities, you should be able to:

1. Demonstrate how to effectively immobilize an injured body part.

2. Make appropriate decisions about care when given an example of an emergency involving an injury to the musculoskeletal system.
OUTLINE

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KEY POINTS

Types Of Musculoskeletal Injuries

Fracture.
♦ A break or disruption in bone.
♦ Classified as open or closed.

Dislocation
♦ Displacement or separation of a bone from its normal position at a joint.

Sprain
♦ The partial or complete tearing of ligaments and other tissues at a joint.

Strain
♦ A stretching and tearing of muscle or tendon fibres.

Common Signs and Symptoms of Musculoskeletal Injuries

♦ Pain.
♦ Swelling.
♦ Deformity.
♦ Discolouration.
♦ Bone protruding from wound.
♦ Inability to use the affected part.
♦ Grating bones.
♦ Snapping or popping sound.
♦ Cause of injury, such as fall from a height.

Care for Musculoskeletal Injuries

♦ Rest.
♦ Immobilization.
♦ Cold.
♦ Elevation.
♦ LEARNING ACTIVITIES

Matching

Match each term with its definition. Write its letter on the line in front of the definition.

Terms

a. Fracture
b. Ligament
c. Bone
d. Sprain
e. Muscle
f. Tendon
g. Strain

Definitions

1. ___A fibrous band that attaches muscle to bone
2. ___A break or disruption in bone tissue
3. ___A tissue that lengthens and shortens to create movement
4. ___Excessive stretching and tearing of ligaments at a joint
5. ___A fibrous band that holds bones together at a joint
6. ___A dense, hard tissue that forms the skeleton
7. ___Excessive stretching and tearing of muscle tissue

♦ Short Answer

Read each statement or question and write the correct answer or answers in the space provided.

1. What are the four basic principles of splinting?
   1. ______________________
   2. ______________________
   3. ______________________
   4. ______________________

2. Explain why applying cold can be helpful in the care of musculoskeletal injuries.

3. What are the five common signs and symptoms of most musculoskeletal injuries?
   1. ______________________
   2. ______________________
   3. ______________________
   4. ______________________
   5. ______________________

4. List at least five signs and symptoms that would lead you to conclude that a casualty has a serious musculoskeletal injury.
   1. ______________________
   2. ______________________
   3. ______________________
   4. ______________________
   5. ______________________
5. What are the five reasons why you would consider immobilizing a serious musculoskeletal injury?

1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________

♦ CASE STUDIES

Read the case studies and answer the questions that follow.

Case 12.1

You are at the scene where a car has struck a pedestrian. The casualty is lying on the ground nearby. The scene appears safe. On approaching the casualty, you see a bloody wound on the casualty's left forearm and thigh, and significant deformity of the forearm and thigh.

1. What should be your first step in caring for this casualty?
   - a. Do a secondary survey.
   - b. Complete a primary survey.
   - c. Cover the open wound on the forearm.
   - d. Check for other less obvious injuries.

2. T F The danger of shock should be addressed by controlling bleeding, elevating the casualty's legs, and administering oxygen before completing a secondary survey.

3. Since you find no other injuries, you proceed to care for the two injuries. Which would be appropriate care for the forearm injury after you have controlled bleeding and covered the wound with a dressing?
   - a. Securing the forearm to the casualty's body
   - b. Splinting the forearm in the position you found it
   - c. Gently straightening the forearm before applying a rigid splint and sling
   - d. Using an air splint to apply pressure to the wound and straighten the deformity

3. If, after you have splinted the forearm, you note that capillary refill in the fingers of the left hand is slow and the fingers feel cool, what should you do?

Case 12.2

A young man has been shot in the arm while hunting. He is sitting, holding his arm against his chest. You are a member of the hunting party and the only trained first responder. The casualty is conscious, and tells you he is in a "lot of pain" and cannot move his arm. He thinks the bullet "broke something." As you assess the injury, you find an entrance and exit wound in the arm above the elbow. There is minimal bleeding.

1. T F The signs and symptoms indicate a good possibility that this casualty has a fracture of the humerus.
2. How would you determine whether the injured arm is deformed at the injury site?
   a. Visually compare the injured arm with the casualty's uninjured arm.
   b. Apply gentle pressure to see if you can straighten the arm.
   c. Lift the arm gently away from the casualty's side and feel for swelling, bumps, or depressions on both sides of the upper arm.
   d. Without moving the arm, gently run your fingers over the exposed surface to determine if there are noticeable bumps or depressions.

3. What three things can you do to help minimize swelling?
   1. ______________________
   2. ______________________
   3. ______________________

4. List four ways you could check for circulation and sensation in the injured arm?
   1. ______________________
   2. ______________________
   3. ______________________
   4. ______________________
SELF-ASSESSMENT

Circle the letter of the best answer.

1. An effective splint should
   a. Prevent a closed fracture from becoming an open fracture.
   b. Lessen pain and increase the casualty's comfort.
   c. Reduce the risk of serious internal bleeding.
   d. All of the above.

2. You would suspect a serious musculoskeletal injury if a casualty tells you that she:
   a. Has a slight pain in her ankle when she walks.
   b. Has no feeling in her hands.
   c. Has a history of frequent prior dislocations.
   d. Notices that her injured wrist feels warm to the touch.

3. Which is an irregular bone?
   a. Humerus
   b. Sternum
   c. Scapula
   d. Vertebrae

4. When treating an elbow with a suspected fracture, you should immobilize the arm:
   a. And then correct any deformity.
   b. In the position in which it was found.
   c. After the arm has been extended.
   d. Only after correcting any deformity.

5. The four types of splints available to the first responder are the soft splint, rigid splint, traction splint, and
   a. Anatomic splint.
   b. Commercial splint.
   c. Improvised splint.
   d. Flexible splint.

6. How can you distinguish a sprain from a strain?
   a. A sprain will usually swell more quickly than a strain.
   b. A sprain is not usually accompanied by deformity, while a strain is often evidenced by deformity.
   c. A sprain usually causes pain and swelling confined to a joint, while the pain and swelling of a strain are usually in areas other than joints.
   d. A strain is usually the result of severe stress or impact, while a sprain is more often the result of a minimal amount of stress or force.
7. Which of the following are part of general care for musculoskeletal injuries?
   a. Ice and gentle exercise
   b. Rest, immobilization, cold, and elevation
   c. Splints, bandaging, and elevation
   d. Rest and heat packs

8. When using a rigid splint to treat a deformed fracture of the lower leg:
   a. Pad the splint to fit the deformity, and secure the splint in place with cravats.
   b. Have a bystander help you straighten the leg before you apply a rigid splint.
   c. Leave the leg unsplinted until the casualty can be moved to an ambulance.
   d. Bandage the leg using bulky dressings to immobilize the fractured area.

9. For an injury to be classified as a sprain, which structure must be injured?
   a. Tendon
   b. Cartilage
   c. Ligament
   d. Bone

10. Injuries to the musculoskeletal system are identified and cared for during the:
   a. Primary survey.
   b. Secondary survey.
   c. Survey of the scene.
   d. a and b.

11. How would you determine whether an injured arm is deformed at the injury site?
   a. Visually compare the injured arm with the casualty's uninjured arm.
   b. Apply gentle pressure to see if the arm will move to a straighter position.
   c. Lift the arm away from the casualty's side, and feel for swelling, bumps, or depressions on both sides of the arm.
   d. Squeeze the arm to determine if there are noticeable bumps or depressions.

12. Common signs and symptoms of a serious musculoskeletal injury include
   a. Deformity.
   b. Inability to move the affected body part.
   c. Moderate to severe swelling.
   d. All of the above.
13. Which of the following are included in your general care for musculoskeletal injuries?
   a. Gentle exercise and heat.
   b. Rest and ice.
   c. Bandaging and elevation.
   d. Rest and heat.

14. Which parts of an injured forearm must you include in a splint to effectively immobilize a fracture of the radius?
   a. The wrist and forearm.
   b. The forearm and elbow.
   c. The wrist, forearm, and elbow.
   d. The hand, wrist, forearm, and upper arm.

15. How would you determine whether an injured arm is deformed at the injury site?
   a. Visually compare the injured arm with the casualty's uninjured arm.
   b. Apply gentle pressure to see if the arm will move to a straighter position.
   c. Lift the arm away from the casualty's side, and feel for swelling, bumps, or depressions on both sides of the arm.
   d. Squeeze the arm to determine if there are noticeable bumps or depressions.

16. When using a rigid splint to treat a deformed fracture of the lower leg
   a. Pad the splint to fit the deformity and secure it with cravats.
   b. Have a bystander help you straighten the leg before you apply a rigid splint.
   c. Leave the leg unsplinted until the casualty can be moved to an ambulance.
   d. Bandage the leg using bulky dressings to immobilize the fracture area.

17. When splinting a possible fracture, all of the following should be done EXCEPT
   a. Leaving any open wound uncovered.
   b. Immobilizing all serious musculoskeletal injuries before moving a casualty.
   c. Checking circulation and sensation below the injury site before and after splinting.
   d. Minimizing movement of the injured area.

18. For which fractured bone would a traction splint be appropriate?
   a. Femur.
   b. Ulna.
   c. Scapula.
   d. Humerus.
Answers to Exercises

Unit 12-Musculoskeletal Injuries

Matching:
1. f
2. a
3. e
4. d
5. b
6. c
7. g.

Short Answer:
1. Splint only if you can do so without causing more pain and discomfort to the casualty.; Splint an injury in the position that you find it.; Splint the injury site and the joints above and below it.; Check areas above and below the splint for proper circulation and sensation before and after splinting.
2. Cold helps reduce swelling and eases pain and discomfort.
3. Pain; swelling; deformity; discolouration of the skin; inability to move the injured part.
4. Significant deformity; moderate or severe swelling and discolouration; inability to move or use the affected part; protruding bone fragments; casualty feels grating or heard pop; loss of circulation or feeling in an extremity; cause of injury suggests a severe injury.
5. Lessens pain; prevents further soft tissue damage; reduces the risk of serious bleeding; reduces the possibility of loss of circulation; prevents a closed wound fracture from becoming an open fracture.

Case Study 12.1:
1. b
2. F
3. b
4. Loosen the splint and recheck circulation.

Case Study 12.2:
1. T
2. a
3. Splint and elevate the injured part and apply a cold pack.
4. Check for a radial pulse.; Feel the hand for warmth.; Check capillary refill in the fingers.; Check to determine if the casualty can feel you touching his hand.

Self-Assessment:
1. d
2. a
3. d
4. b
5. a
6. c
7. b
8. a
9. c
10. b.
11. a.
12. d.
13. b.
14. c.
15. a
16. a
17. a
18. a
PRACTICE SESSION: Applying a Rigid Splint (Forearm)

☐ Support the injured area
  ♦ Support above and below injury.
  ♦ If possible, have casualty or bystander help you.

☐ Check circulation and sensation
  ♦ Check for circulation and sensation below the injury.

☐ Position the splint
  ♦ Have casualty or bystander hold splint in place.
  ♦ Pad the splint to keep the injured area in a natural position.
□ Secure the splint
- Secure splint above and below injury with cravats or roller bandage.
- If cravats are used, leave the injured area uncovered.

□ Recheck circulation and sensation
- Check for circulation and sensation below the injury.
- Splint should fit snugly but not so tightly that blood flow is impaired.
- If area below the injury is bluish or cool, loosen splint.
PRACTICE SESSION: Applying a Sling and Binder (Arm)

- **Support the injured area**
  - Support above and below injury.
  - If possible, have casualty or bystander help you.

- **Check circulation and sensation**
  - Check hand and fingers for circulation and sensation.

- **Position the splint**
  - Thread one end of bandage under injured arm, across chest, and over uninjured shoulder.
  - Position point of bandage at elbow. Bring other end across chest and over opposite shoulder.
Secure the splint

- Tie ends of sling at side of neck opposite injury.
- Placing a pad of gauze under the knot will make it more comfortable.
- Tie or pin point of sling at elbow, if possible.
- Bind arm to chest using a cravat over injured arm.
- Tie ends of binder on opposite side. Place pad under knot.

Recheck circulation and sensation

- Check hand and fingers for circulation and sensation.
PRACTICE SESSION: Applying an Anatomic Splint (Leg)

□ Support the injured area
   ♦ Support leg above and below injury.
   ♦ Let the ground support the leg whenever possible.

□ Check circulation and sensation
   ♦ Check for circulation and sensation below the injury.

□ Position the splint
   ♦ Thread several cravats above and below the injured area.
   ♦ Do not thread cravat at injury site.
Place uninjured area next to injured area. Secure the splint in place.

Tie ends of each cravat together, with knots.
Check to see that cravats are snug but not too tight.
If more than 1 finger fits under cravats, tighten cravats.

**Recheck circulation and sensation**
Check for circulation and sensation below the injury.
Splint should fit snugly but not so tightly that blood flow is impaired.
If area below the injury is bluish or cool, loosen splint.
PRACTICE SESSION: Applying a Soft Splint (Ankle)

□ Support the injured area
  ♦ Support above and below injury.
  ♦ If possible, have casualty or bystander help you.

□ Check circulation and sensation
  ♦ Check for circulation below the injury.

♦ Position the splint
  ♦ Thread several cravats above and below the injury.
  ♦ Fold or wrap the splint gently around the injured area.
Secure the splint in place

- Tie cravats.
- For an injury to the ankle, tie cravat around foot, from heel to front of ankle.
- If more than 1 finger fits under cravats, tighten cravats.

Recheck circulation and sensation

- Check for circulation and sensation below the injury.
- Splint should fit snugly but not so tightly that blood flow is impaired.
- If area below the injury is bluish or cool, loosen splint.