

## INSTRUCTOR GUIDE

TOPIC: Trauma Basics: Managing Lower Extremity Fractures (Revised 6/2010)

TIME REQUIRED: Three Hours

MATERIALS: Splints, Traction Splints, Scoop Stretcher, Long Spine Board, Blankets, Pillows, Roller Gauze, Triangular Bandages,

REFERENCES: Brady Emergency Care 10<sup>th</sup> Edition, Maryland Medical Protocols for Emergency Medical Services Providers, and MIEMSS DVD, Lower Extremities Resource for EMS Instructors

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### PREPARATION:

**MOTIVATION:** An important patient care skill is the ability to rapidly immobilize a suspected lower extremity fracture. Many lower extremity fractures are particularly emergent, both due to the forces involved in fracturing certain bones and the possibility of significant internal bleeding. Effective splinting minimizes the movement of broken bone ends or dislocated joints. Proper splinting of these lower extremity fractures will help to reduce damage to the soft tissues, prevent a closed fracture from becoming an open one, help to reduce bleeding, and minimize the pain felt by a patient.

**OBJECTIVE (SPO):** The Emergency Medical Technician will display a working knowledge of the various lower extremity splinting methods, their advantages and disadvantages and by practical application the method(s) of immobilizing various lower extremity injuries in accordance with the Maryland Medical Protocols for Emergency Medical Services Providers and local practice.

### OVERVIEW:

#### Lower Extremity Fractures

- \* Introduction
- \* Pelvic fractures
- \* Hip dislocation/fractures
- \* Femur fractures
- \* Knee fractures
- \* Tibia/Fibula fractures
- \* Ankle/Foot fractures

## LOWER EXTREMITY FRACTURES

- SPO 1-1 The student will demonstrate a basic understanding of lower extremity fracture management, and, by participation and observation, the various methods utilized to immobilize specific lower extremity fractures.
- EO 1-1 Discuss care, realigning and hazards of splinting
- EO 1-2 Describe and perform the various methods of immobilizing a pelvic fracture.
- EO 1-3 Describe and perform the methods of immobilizing hip injuries
- EO 1-4 Describe and perform the methods of immobilizing femur fractures
- EO 1-5 Describe and perform the methods of immobilizing knee dislocation
- EO 1-6 Describe and perform the various methods of immobilizing tibia/fibula fractures
- EO 1-7 Describe and perform the various methods of immobilizing ankle/foot fractures

It is the intended purpose of this drill is to review and build on basic skills with the emphasis on improving efficiency and teamwork. It is assumed that the participants have knowledge of the subject matter. The drill should include minimal instruction and maximum skills practice. It is also assumed that a proper patient assessment has been made which would reveal the injuries being treated. Teams of two students should be created for the practical exercises.

#### I. Introduction (1-1)

A. The proper care for all painful, swollen, or deformed lower extremities is splinting.

B. In order to be effective, splinting must immobilize bone ends and adjacent joints.

C. Emergency Medical Technicians immobilize fractured extremities for the following reasons:

1. Minimizing the movement of broken bone ends and dislocated joints
2. Decreasing the amount of pain felt by a patient
3. Prevention of additional injury to soft tissue in the area of the fracture
4. Prevention of a closed fracture becoming a more serious open fracture
5. To help minimize blood loss

#### D. Realigning a Deformed Extremity

1. Allows a fractured extremity to be more easily immobilized
2. It can restore circulation to an extremity
3. Attempts at splinting a fractured extremity in the deformed position increases the chance that it can become an open fracture and allows more damage to soft tissues.
4. Injuries to joints should usually be splinted the way they are found unless circulation has been disrupted.
  - a) If circulation has been affected an attempt should be made to a neutral position if no resistance is felt

#### E. Hazards of Splinting

1. “Splinting someone to death”, A focus on splinting without the treatment of life threatening conditions
2. Applying a splint too tightly can restrict blood flow and injure nerves and muscles

**NOTE: All proper Body Substance Isolation precautions must be taken when performing any patient care including splinting of fractures.**

II. Pelvic Fractures (1-2) (If available use MIEMSS DVD to demo)

- A. Keep the movement of the patient to a minimum
  - 1. When movement is necessary move patient as a complete unit.
  - 2. Assess neurological function distal to the site of the injury
  - 3. Help prevent additional injury to the pelvis
    - a. Place a folded blanket between the patient's legs from the groin to the feet and tie the legs together with wide cravats
  - 4. Immobilize patient on a long spine board. Be careful to avoid placing straps over the pelvic area.
  - 5. Reassess neurological function distal to the site of the injury

**NOTE:** It is sometimes difficult to differentiate between a fracture of the pelvis and of the upper femur. When in doubt, treat for a pelvic fracture in order to protect blood vessels and nerves. There may also be spinal injuries!

III. Hip injuries (1-3) (If available use MIEMSS DVD to demo)

- A. Dislocation occurs when the head of the femur is pulled or pushed from the pelvic socket.
  - 1. Assess neurological function distal to the injury
  - 2. Immobilizing using a long spine board
    - a. Place patient on long spine board
    - b. Immobilize the limb utilizing blankets or pillows between the legs and bind the legs together
    - c. Secure patient to long spine board
  - 3. Immobilizing using an orthopedic stretcher
    - a. Immobilize the limb utilizing blankets or pillows between the legs and bind the legs together.
    - b. Adjust the length of the orthopedic stretcher to fit the patient
    - c. Break the orthopedic stretcher apart and ease the patient into the device
  - 4. Reassess distal neurological function

B. A hip fracture is actually a fracture of the proximal femur and not the pelvis. It can occur to the femoral head, the femoral neck or the area just below the neck of the bone.

1. Assess neurological function distal to the injury
2. Immobilizing by binding legs together
  - a. Immobilize the limb utilizing blankets or pillows between the legs and bind the legs together
  - b. Carefully place the patient on a long spine board and secure patient or utilize an orthopedic stretcher
3. Immobilizing by use of padded splints
  - a. Place cravats under the patient at the natural voids and adjust them for placement at the chest, abdomen, below the crotch, above and below the knee, and at the ankle
  - b. Place one splint on the inside of the injured leg. Ideally it should extend from the patient's crotch to beyond the foot
  - c. Place a second splint on the outside of the injured leg. Ideally it should extend from the patient's armpit to beyond the foot
    - 1) The ends of the splints at the crotch and armpit should be padded for comfort
  - d. Secure the splints together utilizing the pre-placed cravats
    - 1) All voids at the ankle and knee that are present should be padded prior to securing the splints
  - e. Reassess distal neurological function
  - f. Place patient on long spine board and secure or utilize an orthopedic stretcher

#### IV. Femur fracture (1-4) (If available use MIEMSS DVD to demo)

A. For a localized injury to a femur the splint of choice is a traction splint, when one is unavailable the legs may be bound together after being placed in an anatomical position

4. Manually stabilize the injured leg
5. Assess neurological function distal to the site of the injury
6. Measure the splint for proper length on the **uninjured** leg and open all straps
7. Apply ankle hitch to patient's ankle
8. Apply manual traction to the injured leg and position the splint under the injured leg.

9. Secure the ischial strap
10. Attach the ankle hitch to the splint and tighten. Manual traction can now be released
11. Secure the cradle straps
12. Reassess distal neurological function
13. Secure the patient to a long spine board for transportation

V. Knee injury (1-5) (if available use MIEMSS DVD to demo)

A. Bent Knee

1. Assess neurological function distal to the injury
2. Immobilize in the position in which the leg is found
  - a. Stabilize knee above and below the injury site
  - b. Two splints of the same length are placed on either side of the injured bent leg
  - c. Place a cravat through the void created by the knee and tie the two boards together
  - d. Using a two cravats, secure the splints to the ankle and secure the splints to the thigh
  - e. Reassess distal neurological function

C. Straight knee

1. Single splint method
  - a. Assess neurological function distal to the injury
  - b. Use a board splint that extends from the buttocks to approximately 4 inches beyond the foot
  - c. Stabilize the injured leg
  - d. Position the splint underneath the leg
  - e. Pad the voids
  - f. Secure (hitch) ankle to board splint using a cravat
  - g. Use cravats or 6-inch roller gauze to secure remainder of leg to splint
  - h. Place a folded blanket between patients legs

- i. Tie thigh, calves and ankles together
- j. Reassess distal neurological function
2. Two splint method
  - a. Stabilize the injured leg
  - b. Place one splint on the inside of the leg from groin to approximately four inches beyond foot, padding the splint in the groin area
  - c. Place one splint the outside of the leg from iliac crest to approximately four inches beyond foot
  - d. Secure splints using cravats at thigh, above and below knee, and at the calf
  - e. Cross and tie two cravats at the ankle, or hitch the ankle
  - f. Reassess distal neurological function

VI. Tibia/Fibula fractures (1-6) (If available use MIEMSS DVD to demo)

D. Assess neurological function distal to injury site

E. Single splint method

1. Measure splint from mid-thigh to approximately four inches beyond ankle
2. Apply gentle manual traction and lift leg approximately 10 inches above the ground
3. Position the splint under the leg from the mid-thigh
4. Secure (hitch) ankle with a cravat and secure the leg to the splint with six inch roller bandage
5. Reassess distal neurological function

F. Two splint method

1. Measure splints they should extend above the knee and below the ankle
2. Apply gentle manual traction and place one splint on the inside of leg and second splint outside of leg
3. Secure the splint utilizing six inch roller bandage from the ankle to the thigh, padding voids
4. Reassess distal neurological function

5. Transport with leg elevated

VII. Ankle/Foot fractures (1-7) (If available use MIEMSS DVD to demo)

- G. Long splints extending from above the knee to beyond the foot can be used, however an effective and quick method is the soft splint
  1. Stabilize the limb and remove the shoes if it can be removed easily and can be done without movement to the ankle
  2. Lift the limb without applying traction
  3. Place three cravats on the floor under the ankle and place a pillow lengthwise on top of the cravats
  4. Lower the ankle onto the pillow
  5. Tie the cravats so that they are at the top, mid-point, and at the heel
  6. At the arch of the foot, loosely tie a fourth cravat
  7. Elevate and reassess distal neurological function

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EVALUATION