Trauma Basics: Managing Upper Extremity Fractures
This Month’s Drill was prepared by
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INSTRUCTOR GUIDE

Time Required: Three Hours

Teaching/Learning Materials: Board splints, Blankets, Pillows, Roller gauze, Triangular Bandages,

References:

• Brady Emergency Care, Prehospital Emergency Care (and/or other emergency care texts): Assessment: Initial, Vital Signs/SAMPLE History, Trauma Patient Assessment; Musculoskeletal Injuries—Upper Extremity Injuries

• Maryland Medical Protocols for Emergency Medical Services Providers: Trauma Protocol—Hand/Upper/Extremity Trauma

MOTIVATION: Though upper extremities consist of smaller bones than lower extremities, painful, swollen, deformed injuries to the shoulder girdle, arm, forearm, wrist, hand, and fingers are no less significant. It is just as critical to carefully check for and manage upper extremity injuries quickly and appropriately. Just like lower extremities, upper extremities are important for daily life activities. Inattention to their injuries may result in a long recovery or permanent disability. Using correct assessment and splinting methods reduces pain, bleeding, and swelling; minimizes movement of broken bones or dislocated joints; and reduces damage to soft tissues. Further, careful handling and correct splinting methods help prevent a closed fracture from becoming an open one.

Student Performance Objective: Given information and resources, splinting materials, demonstration, and time to practice, the emergency services provider will select appropriate splinting/immobilization materials and demonstrate splinting methods for fractures and dislocations to the upper extremities. Emergency care providers will follow Maryland Medical Protocols for Emergency Medical Services Providers, acceptable Maryland medical practice, and use emergency care text resources as guidelines.

Enabling Objectives:

• List management, assessment, and care steps for upper extremity fractures.
• Review Hand/upper Extremity Trauma Protocol
• Describe and demonstrate methods of splinting fractures of the upper extremities:
  ○ Shoulder (scapula) and collar bone (clavicle)
  ○ humerus (arm)
  ○ elbow
  ○ forearm (forearm), wrist (carpals), and hand (metacarpals)
  ○ fingers (phalanges).

Overview:

• Management, Assessment, and Care
Hand/upper Extremity Trauma Protocol
• Splinting Upper Extremity Fractures

I. Management, Assessment, and Care
   A. Management
      1. Review MIEMSS Protocols for General Patient Care
      2. Review assessment of a trauma patient
         a. Initial assessment
         b. Vital Signs and SAMPLE
         c. Focused history and physical exam
      3. Review purposes of splinting (Painful, swollen, deformed extremities: assume a fracture)
         a. Immobilize the extremity, including the joint above and below the injury site
         b. Minimize movement and decrease pain
         c. Prevent further soft tissue injury
         d. Prevent a closed fracture from becoming an open fracture
         e. Control bleeding
      4. Review purposes of repositioning a deformed extremity
         a. Provide effective splinting
         b. Attempt to restore circulation
         c. Contribute to patient comfort
         d. Reduce possibility of a closed fracture becoming an open fracture
         e. Reduce further soft tissue damage
      5. Review management of joint injuries
         a. Splint in the position found
            1) If circulation is absent—reposition to neutral position
            2) Reposition if the attempt is met with no resistance
            3) Reposition to establish a pulse

   B. Assessment
      1. Patient complains of pain or tenderness, guards injury site; describes incident, points to injury site
      2. Care provider examines site, looks for deformity or angulation (compare to uninjured side), and other injured areas
3. Patient may complain of grating sensation or sound (crepitis) a “pins and needles” sensation

4. Care provider looks for swelling and/or deformity, angulation, bruising, exposed bone

5. Patient may complain of inability to move joint or extremity

6. Care provider checks for joints that may be locked in an odd position (dislocation)

7. Care provider checks for distal pulse, motor function, and sensation (p-m-s)

C. Care (general)

1. Take BSI precautions

2. Perform an Initial Assessment

3. Perform a Rapid Trauma Exam if spinal injury is suspected (apply cervical collar)

4. Care for life-threatening injuries first

5. Assess for painful, swollen, deformed extremities

   a. Low-priority/stable patient: splint individual injuries

   b. High-priority/unstable patient: immobilize on a long board, load-and-go

6. Stabilize the injury site and check distal pulse, motor function, sensation (p-m-s)

7. Cover open wounds, elevate extremity while splinting

8. Measure and select a splint appropriate to the extremity

   a. Position splint

   b. Maintain stabilization until splint is secured

   c. Do not apply splint too tightly, cutting off circulation, damaging nerves and soft tissue

   d. Do not apply splint too loosely, reducing its ability to immobilize, causing further soft-tissue damage and an open fracture

9. Recheck distal pulse, motor function, sensation (p-m-s)

10. Apply a cold pack to injury site

II. Hand/Upper Extremity Trauma Protocol

A. Injuries

1. Complete or incomplete hand or upper extremity amputations

2. Partial or complete finger or thumb amputations

3. Crushing, degloving, or devascularization injuries

4. High-pressure injection injuries

5. Trauma resulting in loss of perfusion
6. Trauma with suspected nerve injury (compartment syndrome)

B. Referral

1. Adult patients: Curtis National Hand Center at Union Memorial Hospital
2. Pediatric patients (have not reached 15th birthday): Pediatric Trauma Center
3. Stable patients with isolated injury at or below mid-humerus: Hand Center or nearest appropriate trauma center

C. Contraindications for referral to specialty center

1. Patients with unstable or abnormal vital signs: transport to trauma center
2. Patients with major and/or multiple system trauma: transport to trauma center
3. Patients with partial or complete toe amputation: transfer to medical facility

D. Care for amputated part

1. Keep dry
2. Place in sealed plastic bag
3. Place on top of ice
4. Do not freeze

III. Splinting Upper Extremity Fractures (Review, Demonstration, and Practice)

A. Shoulder (scapula) and collar bone (clavicle)

1. Stabilize the injured extremity
2. Check distal p-m-s
3. Use a sling and swathe
4. Position sling and secure with forearm slightly elevated across chest
5. Position knot so it is not resting on spine; pad the knot
6. Secure the point of the sling
7. Stabilize the arm with a cravat across the chest maintaining elevation
8. Recheck distal p-m-s

B. Humerus (arm)

1. General care
   a. Stabilize the injured extremity
   b. Check distal p-m-s
   c. Place hand in position of function using roller gauze
   d. Immobilize (see specific care below) with board and/or sling and swathe
   e. Recheck distal p-m-s

2. Specific care
a. Proximal fracture: use a sling and swathe as with scapula/clavicle
b. Distal fracture: use a narrow sling (supporting wrist), leaving elbow exposed; stabilize with a swathe
c. Mid shaft: measure and secure a padded board splint to arm, leaving fingertips exposed; support with a sling, stabilize with a swathe

C. Elbow

1. General care
   a. Check distal p-m-s
   b. With a distal pulse, stabilize and splint in position found
   c. With no distal pulse, attempt once to gently reposition and stabilize the injured extremity to obtain a pulse
   d. Place hand in position of function using roller gauze
   e. Immobilize (see specific care below)
   f. Recheck distal p-m-s

2. Specific care
   a. Elbow in straight position
      1) Measure and secure a padded board splint, leaving fingertips exposed
      2) Place padding between patient and splinted arm
      3) Secure arm to torso
   b. Elbow in bent position
      1) Place padded board splint over angle of the arm
      2) Secure with cravats
      3) Apply a wrist sling, keeping forearm elevated against chest

D. Radius/Ulna (forearm), wrist (carpals) and hand (metacarpals)

1. General care
   a. Stabilize the injured extremity
   b. Check distal p-m-s
   c. Place hand in position of function using roller gauze
   d. Immobilize (see specific care below) with board and/or sling and swathe
   e. Recheck distal p-m-s

2. Specific care
   a. Measure and apply splint from elbow to fingertips
b. Secure splint with roller gauze, wrapping distal to proximal, leaving fingertips exposed

c. Apply sling, keeping forearm elevated against chest, and secure with a cravat

E. Fingers (phalanges)
1. Splint injured finger to an uninjured finger with tape, or
2. Splint injured finger with tongue depressor

REVIEW: Trauma Basics: Managing Upper Extremity Fractures

• Management, Assessment, and Care
  ○ List MIEMSS Protocols for General Patient Care
  ○ List purposes of splinting
  ○ List management steps of joint injuries
  ○ List assessment steps for a trauma patient
  ○ List general care steps for a trauma patient

• Hand/Upper Extremity Trauma Protocol
  ○ State MIEMSS Trauma Protocol for Hand/Upper Extremity Trauma
    ▪ List indications for transport to specialty center: adults, pediatrics
    ▪ List contraindications for transport to specialty center

• Splinting Upper Extremity Fractures
  ○ List the care steps for immobilizing each of the following fractures
    ▪ Shoulder (scapula) and collar bone (clavicle)
    ▪ Humerus (arm)
    ▪ Elbow
    ▪ Forearm (forearm), wrist (carpals), and hand (metacarpals)
    ▪ Fingers (phalanges).