GEORGIA | PEACH STATE PATHWAYS

Career, Technical, & Agricultural Education

HEALTHCARE SCIENCE

COURSE: 25.562 Concepts of Emergency Medicine

UNIT: 25.1 Trauma Care

INTRODUCTION

Annotation:

This unit will give the student an understanding of how to assess and manage patients with bleeding, soft tissue and musculoskeletal injuries. Students will have the opportunity to apply their knowledge in performing several skills including immobilization techniques using various pieces of equipment. This is a large unit that contains several lessons and a written assessment in two parts.

Grade(s):

	9th
	10th
X	11th
X	12th

Time:

Twenty 50 minute periods

Author:

Mark Elsey, BS, NREMT-P

Additional Author(s):

Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation.

FOCUS STANDARDS

GPS Focus Standards:

HS-CEM-12:

TRAUMA. Students will accurately assess and treat patients with bleeding, soft-tissue, and musculoskeletal injuries.

a. Integrate the knowledge and skills necessary to assure the provision of necessary assessment of internal and external soft-tissue injuries (including but not limited to): arterial, venous, and capillary bleeds; external bleeding; shock; burns; blunt and penetrating trauma; chest wounds; abdominal injuries; and amputations.

b. Demonstrate the skills applicable to the management of internal and external soft-tissue injuries utilizing personal protective equipment and standard precautions (including but not limited to): arterial, venous, and capillary bleeds; external bleeding; shock; burns; blunt and penetrating trauma; chest wounds; abdominal injuries; and amputations.

c. Integrate the knowledge and skills necessary to assure the provision of necessary assessment of musculoskeletal injuries (including but not limited to): open, closed, painful, swollen, deformed extremity; fractures and dislocations; head and spinal cord injuries.

d. Demonstrate the skills applicable to the management of internal and musculoskeletal injuries; utilizing personal protective equipment and standard precautions (including but not limited to): open, closed, painful, swollen, deformed extremity; fractures and dislocations; head and spinal cord injuries.

e. Relate the mechanism of injury to potential injuries of the head and spine.

GPS Academic Standards:

ELA11C1: The student demonstrates understanding and control of the rules of the English language, realizing that usage involves the appropriate application of conventions and grammar in both written and spoken formats.

National / Local Standards / Industry / ISTE:

- See module at:
- www.nhsta.gov/people/injury/ems/pub/frnsc.doc
- Lesson 5-2 through 5-5
- Illness and Injury

UNDERSTANDINGS & GOALS

Enduring Understandings:

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- Internal and musculoskeletal injuries come from many different causes.
- The care provided for these injuries varies depending on the extent of the problem. Some injuries are life threatening.

It is important for the First Responder to understand the importance of accurate patient assessment and application of appropriate care in an efficient manner. The care may range from controlling bleeding to managing soft tissue injuries to managing musculoskeletal injuries that may require immobilization of body parts or caring for amputations.

Essential Questions:

- What are different methods of diagnosing and caring for musculoskeletal injuries?
- What is the best method to controlling bleeding?
- Will there ever be a substitute made for blood that be used in a pre-hospital environment by EMS personnel?
- How should soft tissue injuries be assessed and managed?
- Why is it important to care for an amputated body part?

Knowledge from this Unit:

- How to assess and manage a bleeding patient
- How to assess and manage soft tissue injuries
- How to use backboards, splints, traction splints and body splints.
- The rationale for the feeling patients who have need for immobilization of the painful, swollen, deformed extremity.
- How to demonstrate a caring attitude towards patients with a musculoskeletal injury who request emergency medical services.
- How to place the interests of the patient with a musculoskeletal injury as the foremost consideration when making any and all patient care decisions.
- The need to communicate with empathy to patients with a musculoskeletal injury, as well as with family members and friends of the patient.
- How to evaluate a responsive patient with a suspected spinal cord injury.
- When to stabilize the cervical spine.

Skills from this Unit:

- Demonstrate direct pressure as a method of emergency medical care for external bleeding.
- Demonstrate the use of diffuse pressure as a method of emergency medical care for external bleeding.
- Demonstrate the use of pressure points as a method of emergency medical care for external bleeding.
- Demonstrate the care of the patient exhibiting signs and symptoms of internal bleeding.
- Demonstrate the steps in the emergency medical care of open soft tissue injuries.
- Demonstrate the steps in the emergency medical care of a patient with an open chest wound.
- Demonstrate the steps in the emergency medical care of a patient with open abdominal wounds.
- Demonstrate the steps in the emergency medical care of a patient with an impaled object.
- Demonstrate the steps in the emergency medical care of a patient with an amputation.
- Demonstrate the steps in the emergency medical care of an amputated part.

ASSESSMENT(S)

Assessment Method Type: Select one or more of the following. Please consider the type(s) of differentiated instruction you will be using in the classroom.

____ Pre-test
X Objective assessment - multiple-choice, true- false, etc.
_X_ Quizzes/Tests
_X_ Unit test
X Group project
X Individual project
x Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
__ Self-check rubrics
__ Self-check during writing/planning process
__ Journal reflections on concepts, personal experiences and impact on one's life
__ Reflect on evaluations of work from teachers, business partners, and competition judges
__ Academic prompts
__ Practice quizzes/tests
x Subjective assessment/Informal observations
__ Essay tests
_x_ Observe students working with partners
_x_ Observe students role playing
x Peer-assessment
__ Peer editing & commentary of products/projects/presentations using rubrics
_x_ Peer editing and/or critiquing
x Dialogue and Discussion
__ Student/teacher conferences
__ Partner and small group discussions
_x_ Whole group discussions
_x_ Interaction with/feedback from community members/speakers and business partners
x Constructed Responses
__ Chart good reading/writing/listening/speaking habits
_x_ Application of skills to real-life situations/scenarios
____ Post-test

Assessment(s) Title:

- GPS multimedia presentation
- Vocabulary Contract
- Unit Workbook pages
- Unit Quiz
- Unit Written assessment

Assessment(s) Description/Directions:

- Learners will complete the Practical Evaluations using NREMT candidate skill sheets from www.nremt.org, candidate section; basic skills. See Attachments.
- Learners will complete the workbook pages related to this unit. Workbook pages will be graded on a 100 point scale.
- Students complete a written exam on a scale of 0-100 to assess their understanding of bleeding, soft-tissue, and musculoskeletal injuries.
- Students will complete the Chapter Key Terms (Definitions) using a vocabulary contract. Vocabulary Contract will be graded on a 100 point scale.
- Students will create a PowerPoint that will analyze and discuss the art of limb reattachment assessed by the project rubric on www.teachnology.com or individual teacher made rubric.

Attachments for Assessment(s):

LEARNING EXPERIENCES

Instructional planning: Include lessons, activities and other learning experiences in this section with a brief description of the activities to ensure student acquisition of the knowledge and skills addressed in the standards. Complete the sequence of instruction for each lesson/task in the unit.

Sequence of Instruction

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

HS-CEM-12: TRAUMA. Students will accurately assess and treat patients with bleeding, soft-tissue, and musculoskeletal injuries.

2. Review Essential Questions.

- What are different methods of diagnosing and caring for musculoskeletal injuries?
- What is the best method to controlling bleeding?
- Will there ever be a substitute made for blood that be used in a pre-hospital environment by EMS personnel?
- How far has limb reattachment come in the past twenty years?

3. Identify and review the unit vocabulary.

Capillary refill	Hypoperfusion	Hypovolemic shock
Circumferential pressure	Perfusion	Epistaxis
Pressure point	Hemorrhagic shock	Shock
Abrasion	Amputation	Avulsion
Bandage	Contusion	Crush injury
Dressing	Evisceration	Hematoma
Full-thickness burn	Laceration	Occlusive
Partial-thickness burn	Penetration or Puncture	Superficial burn
Angulated injury	Closed injury	Crepitation
Direct injury	Indirect injury	Mechanism of injury
Open injury	Pneumatic splints	Rigid splints
Position of function	Sling and swathe	Traction splints
Twisting injury	Cervical spinal immobilization device	
Kendrick Extrication Device (KED)	Log Roll	Rapid extrication
Short backboard	Long Backboard (full-body spinal immobilization device)	

4. Assessment Activity

Interest Approach

Motivation: Trauma is the leading cause of death in the United States for persons between the ages of 1 and 44. Understanding the mechanism of injury and relevant signs and symptoms of bleeding and shock (hypoperfusion) is of paramount importance when dealing with the traumatized patient.

Soft tissue injuries are common and dramatic, but rarely life-threatening. Soft tissue injuries range from abrasions to serious full-thickness burns. It is necessary for the EMT-Basic to become familiar with the treatment of soft tissue injuries with emphasis on controlling bleeding, preventing further injury, and reducing contamination.

Musculoskeletal injuries are one of the most common types of injuries encountered by the First Responder. These injuries are largely non–life-threatening in nature; however, some may be life-threatening. Prompt identification and treatment of musculoskeletal injuries is crucial in reducing pain, preventing further injury, and minimizing permanent damage.

Injuries to the head and spine are extremely serious and may result in severe permanent disability or death if improperly treated or missed in the assessment.

LESSON ONE

Assign GPS's Vocabulary and associated workbook pages, due on day 4 or 5

DISSCUSION/LECTURE/POWER POINT/VIDEO

BLEEDING

A. The blood
- **1.** Importance-without blood circulating, you would quickly die.
- **2.** Functions of blood
  - **a.** Carry oxygen and carbon dioxide (respiration)
  - **b.** Carry food to tissues (nutrition)
  - **c.** Carry wastes from tissues to organs of excretion (excretion)
  - **d.** Carry hormones, water, salts, and other compounds needed to keep bodies functions in balance (body regulation)
  - **e.** Protect against disease-causing organisms (defense)
- **3.** Components
  - **a.** Red blood cells
  - **b.** White blood cells
  - **c.** Elements involved in forming blood clots
  - **d.** Plasma-a watery, salty fluid that carries blood cells
- **4.** Volume
  - a. About 6 liters, or 12 pints, in a typical adult
  - b. Important because a certain volume of blood must be maintained for proper heart action, blood flow, and exchange between blood and body cells

c. Excessive bleeding causes circulatory system collapse, which is followed by death.

B. Blood vessels
- **1**. Arteries carry blood away from heart to body.
- **2.** Capillaries are thin-walled vessels that allow for exchange of oxygen and nutrients with body cells.
- **3**. Veins carry blood back to the heart from body.

C. General considerations
- **1.** Body substance isolation precautions-must be taken when dealing with bleeding patients.
- **2.** Severity of blood loss-base estimate on patient's signs and symptoms; bleeding serious if signs and symptoms of shock present.
- **3.** Body's normal response to bleeding-natural response is for blood to clot; in major bleeding, clotting will not occur.

*******HAVE students hand draw a capillary bed to show exchange of gases between cells****

LESSON TWO

DISSCUSION/LECTURE/Multimedia Presentation/VIDEO

TYPES OF BLEEDING (EXTERNAL OR INTERNAL)

A. External bleeding
- **1.** Classified by type of vessel
  - **a.** Arterial bleeding-blood flow from an artery, bright red, spurting, with rapid and extensive blood loss
  - **b.** Venous bleeding-blood flow from a vein, dark red, with a steady flow, which can also be profuse
  - **c**. Capillary bleeding-blood oozing from a bed of capillaries, red in color but less bright than arterial, flow is slow, and found in minor scrapes and shallow cuts
- **2.** Evaluating external bleeding
  - **a.** Arterial bleeding is most serious. Heart action and vessel pressure prevent blood clot formation.
  - **b.** Venous bleeding ranges from minor to severe. It can be seen under skin surface and occurs deep in the body where veins can be as large as arteries. Venous bleeding can produce rapid blood loss; veins may collapse when cut, which helps control bleeding.
  - **c.** Capillary bleeding is slow and clotting takes about 6 to 8 minutes. The larger open surface increases chances of infection.
- **3**. Controlling external bleeding
  - **a**. Direct pressure
    - **1)** Apply direct pressure to wound site with your gloved hand.
    - **2)** Apply firm pressure with a sterile dressing or clean cloth.
    - **3)** Apply pressure until bleeding is controlled (may be 10-30 minutes or longer).
    - **4)** Hold dressing in place with bandages after bleeding is controlled.
    - **5)** Never remove a dressing once it is in place. Add more dressings if blood soaks through dressing.

b. Elevation

1) Elevate injured extremity so that wound is higher than heart.

2) Continue to apply direct pressure to site of bleeding.

****DEMONSTRATE TO STUDENTS HOW TO APPLY DIRECT PRESSURE TO THE FOLLOWING SITES****

c. Pressure points

1) Upper arm-brachial artery

a) Apply direct pressure.

b) If this fails, apply direct pressure with elevation.

c) If this fails, hold patient's upper arm in the palm of your gloved hand, position your fingers in medial groove below biceps muscle, and apply pressure to brachial artery until bleeding stops and you can no longer feel radial pulse.

****Ask the students to find their own brachial pressure point and that of another student and practice*****

***** USE A MANIKIN FOR THIS DEMONSTRATION--- NOT A STUDENT ******

2) Leg-femoral artery

a) Apply direct pressure.

b) If this fails, apply direct pressure with elevation.

c) If this fails, locate anterior medial side of leg where thigh joins lower trunk; you will feel the femoral artery pulse.

d) Use heel of your gloved hand to apply pressure to site. Use your body weight to help apply pressure.

e) Apply necessary pressure to stop bleeding.

d. Tourniquet

1) Locate the site for tourniquet (between wound and patient's heart, usually two inches from wound).

2) Place a pad on site over artery.

3) Place tourniquet around limb and secure it. Then tighten tourniquet until bleeding has stopped.

4) Do not loosen tourniquet once it is in place.

5) Attach a tag or mark patient showing time tourniquet was placed.

***** EMPHASIZE THAT A TOURNIQUET IS USED AS A LAST RESORT******

6) Deliver care for shock. Do not cover tourniquet.

e. Splinting can be used to immobilize an extremity to reduce bleeding. Air splints work well as they also apply pressure.

4. Dressing and bandaging

a. Definitions

1) Dressing-any material used to cover a wound, help control bleeding, and help prevent additional contamination.

2) Bandage-any material used to hold a dressing in place.

b. Types of dressings

1) Sterile and aseptic-free from germs, dirt, and foreign debris. If commercially processed and individually packaged, dressings are usually sterile and aseptic; if not available, be sure dressings are clean.

2) Bulky dressings and multi-trauma dressings-thick dressings large enough to completely cover large wounds, control serious bleeding, and stabilize impaled objects.

3) Occlusive dressings-used for sealing open abdominal and chest wounds. Often made of plastic wrap, they help prevent air from entering wound and fluids from escaping.

4) Improvised dressings-any clean material that can be used to control bleeding, such as handkerchiefs, towels, sheets, other similar materials.

c. Bandaging materials

1) Adhesive bandage will stick to the patient's skin.

2) Tape can be used to hold a dressing in place.

3) Gauze roller bandages

4) Triangular bandages folded into cravats

5) Handkerchiefs or strips of cloth

d. Rules for dressing and bandaging

1) Control bleeding with dressing and bandage. Add dressing material and secure if bleeding soaks through the first dressing.

2) Use sterile or clean materials to prevent further contamination.

3) Cover entire wound with a large enough dressing.

4) Do not remove dressing once in place. Add new dressing if necessary.

5) Do not bandage too tightly, which would restrict blood flow.

6) Do not bandage too loosely. A bandage must help control bleeding with pressure.

7) Do not leave loose ends, which might get caught on something when patient is moved or transported.

8) Do not cover fingers and toes. You can watch for color changes that may show bandage is too tight.

9) Start bandaging from bottom (distal) part of the limb and wrap towards top (proximal) end. This avoids trapping blood in lower end of the extremity.

10) Avoid applying bandage to a narrow area. Instead, spread it over a large area to avoid restricting circulation.

11) Do not bandage over a joint and then try to bend it, which would restrict circulation.

*****Show the students a variety of commercial dressing and bandage materials. Also show a variety of noncommercial items that could be used as dressings and bandages. Ask students to come up with other ideas, guiding them as to which are and are not suitable*******

LESSON THREE

******HANDS ON EDUCATION & PRACTICE*****

Divide the students into groups of four.

Students will practice bleeding control. Use the NREMT's candidate sheet for bleeding control and treatment of shock to help the students. The sheet will also be your rubric/graphic organizer.

*******If you have a moulage kit or a Drama department at your school, "doctor-up" a few students with various wounds and fake blood to help create a sense of realism.**

LESSON FOUR

******HANDS ON EDUCATION & PRACTICE*****

Students will practice bandaging. Use the NREMT's candidate sheet for bleeding control and treatment of shock to help guide the students.

******Please emphasize to the students that bandaging is an art form and that they are the artist. While we the educator can point out various proven forms of bandaging, the students might actually come up with a better/faster method. Encourage experimentation and enjoy the moment of education.**

LESSON FIVE

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

INTERNAL BLEEDING

1. Discuss how the significance of internal bleeding can be simple (bruising, for example) or it can be major and life-threatening, producing shock, heart and lung failure, and eventual death. Care for shock is important.

2. Detecting internal bleeding
- **a.** Wounds that have penetrated skull
- **b.** Blood or bloody fluids in ears and/or nose
- **c.** Patient vomiting or coughing up blood (coffee grounds or frothy red in appearance)
- **d.** Bruises on neck
- **e.** Bruises on chest, possible fractured ribs, penetrating chest wounds
- **f.** Bruises or penetrating wounds to abdomen
- **g.** Hardness or spasms of abdominal muscles
- **h.** Abdominal tenderness
- **i.** Bleeding from rectum or vagina
- **j.** Fractures, especially in pelvic area and long bones of upper arm and thigh, and ribs

3. Signs and symptoms of internal bleeding
- **a.** Patient feels weak.
- **b.** Patient is thirsty.
- **c.** Patient feels cold.
- **d.** Patient feels anxious or restless.
- **e.** Signs of shock associated with internal bleeding
  - **1)** Awareness-altered levels or unconsciousness
  - **2)** Behavior-restlessness or combativeness
  - **3)** Body-may be shaking and trembling (rare)
  - **4)** Breathing-shallow and rapid
  - **5)** Pulse-rapid and weak
  - **6)** Skin-pale, cool, and clammy (may be sweating profusely.)

7) Eyes-dilated pupils

**** **Be sure to stress that none of these signs and symptoms may be present in early stages of internal bleeding. Always suspect and treat for internal bleeding if the mechanism of injury (MOI) is severe enough to indicate it.**

4. Evaluating internal blood loss
- **a.** Severe if there is penetration of chest cavity near heart, liver, spleen or if pelvis is fractured
- **b.** Suspect blood loss of one liter if there is a major fracture in upper arm or thigh bone.
- **c.** Badly bruised skin can contain a 10% blood loss if size of bruise is equal to size of patient's fist.

5. Management of internal bleeding
- **a.** Have someone alert EMS dispatch.
- **b.** Perform scene size-up, including BSI.
- **c.** Perform initial assessment. (Maintain airway, and monitor breathing and pulse.)
- **d.** Keep patient in proper position and lying still.
- e. Loosen restrictive clothing and provide care for shock.
- **f.** Be alert for vomiting.
- **g.** Do not give anything by mouth.
- **h.** Apply pressure dressings if internal bleeding is in an extremity.
- **i.** Reassure patient and keep patient calm.
- **j.** Report the possibility of internal bleeding to EMS personnel.
- **k.** Give oxygen if you are equipped and trained to do so.

*****Ask the students to recall the last bruise they had and how did the get it. This will help them visualize internal bleeding through memory recall and they might be able to suggest what the mechanism of injury (MOI) was.**

LESSON SIX

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

SHOCK

A. Definition-reaction of body to failure of circulatory system to provide enough blood to all vital organs of body. Failure of perfusion or hypoperfusion.

******Another definition can be (ITP) Inadequate tissue perfusion.**

Chances of survival are greatly increased if patient is treated within first hour of injury ("golden hour").

The Body develops shock through:
- **1.** Heart-if heart fails to pump required blood volume efficiently, shock will develop.
- **2.** Vessels-circulatory system must operate as a closed system. If vessels are cut, blood is lost and shock will develop.
- **3.** Blood volume-there must be enough blood to fill vessels. If there is loss of volume or vessels enlarge so system is not filled, shock will develop.

B. Types of shock
- **1.** Hypovolemic-bleeding shock caused by blood loss or loss of plasma.

2. Cardiogenic-heart shock caused by heart failing to pump enough blood.
3. Neurogenic-nerve shock caused when nervous system is damaged from an injury and it cannot control diameter of blood vessels.
4. Anaphylactic-allergy shock, a life-threatening reaction caused by something to which patient is extremely allergic.
5. Psychogenic-fainting, disrupting proper blood flow to brain.
6. Metabolic-fluid shock caused by loss of body fluids.
7. Septic-bloodstream shock caused by infection.

C. Signs and symptoms of shock

1. Symptoms include:
    a. Weakness
    b. Nausea
    c. Thirst
    d. Dizziness
    e. Restlessness and fear
2. Signs of shock include:
    a. Entire body assessment-look for restlessness or combativeness, profuse external bleeding, vomiting or loss of body fluids, shaking and trembling.
    b. Altered mental status-patient may become disoriented, confused, unresponsive, faint or become unconscious.
    c. Breathing-shallow and rapid.
    d. Pulse-rapid and weak.
    e. Skin-pale, cool, and clammy (may be sweating profusely).
    f. Face-pale, often with blue color at lips, tongue, earlobes.
    g. Eyes-lackluster, pupils dilated.

D. Pattern of shock

1. Increased pulse rate
2. Increased breathing rate
3. Restlessness or combativeness
4. Skin changes indicating possible shock
5. Rapid, weak pulse and labored, weakened respirations
6. Changes in mental status
7. Respiratory arrest, then cardiac arrest can develop

***** Have the students hand draw the "downward spiral of shock" this can be found on the internet or in most EMS books. Having this in their folder will help them and create a graphic organizer for shock.**

E. Preventing and caring for shock

1. Alert 911/EMS dispatcher.
2. Perform scene size-up.
3. Perform initial assessment. (Keep patient's airway open and prevent forward tilting of head.)
4. Assist the patient in lying down and explain importance of remaining at rest.
5. Control external bleeding and splint fractures.
6. Keep patient warm but do not overheat.
7. Properly position patient.
8. Give the patient nothing by mouth.
9. Monitor vital signs.
10. Provide oxygen per local protocols.

***** Emphasize that all the signs and symptoms of shock may not be present at once and do not occur in the order listed. Look for the various signs; however, it is best to care for shock to prevent its occurrence rather than start care after the signs are evident.**

**** Be sure to point out that children and young adults will compensate for blood loss better than adults will. With children, once the signs of shock are evident, it may be too late to reverse the process.**

F. Fainting

1. A mild form of shock that is usually self-correcting
2. Examine the patient for injury and keep him lying down.
3. Check blood pressure if you have the equipment.
4. May be a warning sign of more serious problems; assess and take a careful history.
5. Prevent fainting by having patient lower head between knees.

***** Students will ask about locking their knees and passing out, like in band or ROTC, explain to them that it does not cause you to pass out. By locking the knees, you diminish the use of the muscles in your legs; which normally increases the blood return from the legs. As blood pools in the veins of your legs, your heart has less blood returning to be sent to the brain. By unlocking your knees, you are forced to use the muscles in the legs more for the position of standing. There is no artery that gets blocked in the knees and causes the phenomenon.**

****** It takes quite a long time of standing with the knees locked before one begins to feel light-headed and eventually pass out. This is affected by temperature, with fainting more likely on hot days. But in any event, the key is standing with knees locked for <u>long periods</u>, not simply locking your knees.**

LESSON SEVEN

DISSCUSION/LECTURE/MULTIMEDIA PRESENTATION/VIDEO

SOFT-TISSUE AND INTERNAL INJURIES

A. Introduction

1. We have experienced injuries to ourselves, family, or friends; have called them familiar names or terms; and have tended to them with some common sense and procedures.
2. We have considered bleeding as a sign of injury and will consider deformities, swellings, tenderness, breaks in the skin, and other signs of detectable injury and how to provide care for them.
3. This lesson will concentrate on soft-tissue and internal organ injuries, which can be serious but are not always life-threatening unless left untreated.
4. Remember that the emotional well-being of the patient is as important as caring for the injury.

B. Types of injuries

1. Closed wound
a. Internal injury
b. Skin is not broken.
c. Caused by impact of a blunt object.
d. Bleeding ranges from minor to major.
e. Extent of injury ranges from simple bruise to rupturing of internal organs.
f. Bruise
1) Internal bleeding where blood flows between tissues causing discoloration
2) Large bruises can mean serious blood loss and fractures or extensive

damage under the site.

2. Open wound
- **a.** Skin is damaged or broken.
- **b.** Extent of injury ranges from a scrape to tearing or cutting of skin.
- **c.** Bleeding ranges from minor to major.
- **d.** Seriousness from minor to life-threatening
- **e.** Classifications
  - **1)** Scratch and scrape (abrasion)-such as skinned knee
  - **2)** Cut-usually from sharp object
    - **a)** Incision-has smooth edges.
    - **b)** Laceration-has jagged edges.
  - **3)** Puncture-from items such as nails, knives, or gunshots
    - **a)** Penetrating-can be shallow or deep and has an entry wound but no exit wound.
    - **b)** Perforating-has an exit wound as well as an entry wound.
  - **4)** Avulsion-involves tearing large flaps of skin, sometimes completely off, but in some cases flap can remain attached.
  - **5)** Amputation-involves tearing or cutting off an extremity (finger, toe, arm, leg). Usually referred to as traumatic amputation when it occurs in an accident.
  - **6)** Crush injury-a body part is pressed between two objects crushing, bruising, or fracturing tissue.
  - **7)** Burns
    - **a)** Complex soft-tissue injuries
    - **b)** Range from simple sunburn to deeper burns that involve damage to the nerves, vessels, muscles, and bones

******* Have numerous pictures available of various sift tissue injuries to show the students. Discuss with them about the MOI and how care would begin.**

LESSON EIGHT

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

BASIC EMERGENCY CARE

A. Ongoing care
- **1.** Assess patient and care given by individuals at scene before you arrived.
- **2.** Continue or, if necessary, correct any care given.
- **3.** Follow EMS system protocols for assessment and care. Contact dispatch for assistance and to report on situation.

B. Care during assessment
- **1.** Some injuries may need immediate care. Certain soft-tissue injuries may be cared for as you assess patient.
- **2.** Follow local protocols, and remember that many soft-tissue injuries are low priority.

C. Care of closed wounds
- **1.** Bruises are most frequently seen and do not require emergency care.
- **2.** Large bruises may indicate serious bleeding. Swelling and deformity of bruise site may indicate underlying fractures.
- **3.** A rigid abdomen and coughing up blood may indicate serious internal bleeding.

4. Generally, First Responder treatment will be to provide care for shock.

D. Care of open wounds

1. Expose wound-carefully cut clothing away from wound site.

2. Clear wound surface-gently brush away foreign matter without scrubbing site and creating more bleeding.

3. Control bleeding-start with direct pressure, elevate as necessary, use pressure point if bleeding cannot be controlled, and a tourniquet as a last resort. Do not remove dressing once it is in place.

4. Prevent further contamination-dress wound with a sterile or clean dressing or cloth, and secure in place with a bandage.

5. Keep patient lying still, since activity increases bleeding. Cover to keep patient warm (shock care), and protect from the elements.

6. Reassure patient to reduce anxiety, movement, and blood pressure.

7. Care for shock (hypoperfusion) for any patient with any wound. Do not elevate a limb if there is a possibility of fracture.

E. Care for specific injuries

1. Puncture wounds

a. Assume there is internal bleeding, look for an exit wound, and care for both.

b. Provide care

1) DO NOT remove impaled objects.

2) Expose wound. Cut clothing from around object without disturbing it.

3) Control bleeding by direct hand pressure around wound site.

4) Stabilize object by stacking bulky dressings around it, alternating direction of each layer and securing them in place with tape or cravats.

5) Keep patient at rest and reassured.

6) Provide care for shock. Do not elevate legs if object is in leg, abdomen, or pelvis.

2. Avulsions

a. For loose flaps of skin:

1) Clear surface of wound.

2) Gently fold skin back to its normal position.

3) Control bleeding and provide care as for any open wound using bulky dressing.

b. For skin or another body part torn from body:

1) Care for wound with bulky pressure dressings.

2) Preserve avulsed part-wrap it and keep it cool, but do not place in direct contact with ice.

3. Amputations

a. Care for wound with bulky pressure dressings.

b. If bleeding continues, use a pressure point. Apply a tourniquet only as a last resort.

c. Wrap or bag amputated part, and keep it cool.

4. Protruding organs

a. DO NOT try to replace organs.

b. Place a plastic covering over exposed organs to conserve moisture and then a layer of thick pads or dressing to conserve heat. Secure gently in place with cravats.

c. Provide care for shock, and do not give patient anything by mouth.

5. The scalp

a. DO NOT attempt to clean the surface of a scalp wound. This will cause more bleeding and more damage if there is an underlying skull fracture.

b. DO NOT apply finger pressure if there is a chance of skull fracture.

c. May remove an impaled object from cheek if it has penetrated cheek wall and will obstruct airway.

d. Control bleeding with a bulky dressing, and carefully control pressure applied.
e. Secure dressing with a roller bandage, triangular bandage, or cravat.
f. If there are no signs of skull fracture or injuries to spine, neck, or chest, position patient so that head and shoulders are slightly elevated.

6. Facial wounds
a. Make certain airway is open and breathing is adequate.
b. Correct breathing problems as you stabilize head and neck in case of spinal injuries.
c. Control bleeding by controlled direct pressure in case there are underlying fractures.
d. Apply a dressing and bandage.

7. Impaled object in cheek
a. Look in mouth and probe to see if object penetrated cheek wall.
b. Carefully pull or push the object out of cheek wall back in direction that it entered cheek.
c. Place a dressing inside cheek, and monitor so it does not obstruct airway.
d. If object cannot be removed, stabilize it in place with bulky dressings on the outside of cheek.
e. Position patient so blood and fluids drain from mouth.
f. If spinal injuries, place dressing material inside cheek to control blood flow.
g. Dress and bandage outside of wound.

8. Eye injuries
a. General
1) DO NOT remove impaled objects.
2) DO NOT place avulsed eye back into its socket.
3) DO NOT apply direct pressure to a cut eyeball.
4) DO NOT probe into eye socket.

b. Foreign matter
1) Flush by flowing water from corner across surface of eye; hold patient's lids open.
2) Do not flush if eyeball is cut or if there is an impaled object.
3) Cover both patient's eyes to reduce eye movement and discomfort.

c. Burns
1) Heat burns-usually involve only eyelids.
a) Cover eyes with loose, moist dressings.
b) DO NOT apply burn ointment.
2) Light burns-snow blindness and welder's blindness are examples.
a) Close the eyelids.
b) Apply dark or opaque patches, and bandage in place.
3) Chemical burns-chemicals can cause rapid, severe damage.
a) Flush with water for at least 20 minutes.
b) Apply loose, moist dressings.

d. Impaled object
1) Place several layers of dressings or small roller gauze on each side of object.
2) Place a cardboard cup over object and rest it on top of the pad.
3) Secure pad and cup in place with roller bandage.
4) Cover uninjured eye, and secure dressing in place.
5) Care for shock, and provide emotional support to patient.

9. External ear injuries
a. Cuts-apply dressing and bandage in place.
b. Tears-apply bulky dressings, beginning with several layers behind the torn tissue.
c. Avulsions-use bulky dressings, bandage into place. Wrap and preserve avulsed part, keeping it dry and cool.

10. Internal ear injuries

a. Bleeding from ears
- **1)** DO NOT pack ear canal.
- **2)** Apply external dressings.
- **3)** Hold in place with bandages.

b. Foreign objects in the ear
- **1)** DO NOT attempt to remove.
- **2)** Apply external dressings if necessary.
- **3)** Provide emotional support.

c. Bloody or clear fluids draining from the ear
- **1)** DO NOT pack the ear canal.
- **2)** Apply a loose external dressing.

d. Clogged or stopped up ear
- **1)** May indicate damage to ear drum, fluids in middle ear, objects in ear.
- **2)** DO NOT probe the ear.
- **3)** Keep patient from hitting side of head in an attempt to clear it.

11. Nose injuries
- **a.** Maintain an open airway, and stop bleeding.
- **b.** For conscious patient
  - **1)** Sit him forward to prevent blood from draining down throat, which causes nausea and vomiting.
  - **2)** Pinch nostrils; DO NOT pack them.
- **c.** For unconscious patient
  - **1)** Elevate head slightly or place patient on one side for drainage (no spinal injuries suspected).
  - **2)** Pinch the nostrils.
- **d.** Fluids draining from the nose
  - **1)** May indicate skull fracture.
  - **2)** DO NOT pack the nose.
  - **3)** Apply loose dressing.
- **e.** Foreign objects
  - **1)** DO NOT remove or probe nostrils.
  - **2)** DO NOT allow patient to blow his nose while bleeding or after controlling a recent bleed.
- **f.** Avulsions
  - **1)** Apply pressure dressing to site.
  - **2)** Wrap and save avulsed part, and keep it cool.

12. Injury to mouth
- **a.** Assure airway is open and breathing is adequate.
- **b.** If there is no suspected spinal injury, sit patient forward for drainage or position on one side with head downward for drainage.
- **c.** Cut lips-place rolled or folded dressing between lip and gum.
- **d.** Avulsed lips
  - **1)** Apply pressure bandage to site.
  - **2)** Wrap and save part, and keep it cool.
- **e.** Cuts to internal cheek
  - **1)** DO NOT pack mouth.
  - **2)** Place dressing between cheek and gum; hold in place with gloved hand.

13. Neck wounds
- **a.** Signs
  - **1)** Difficulty speaking, loss of voice
  - **2)** Airway obstruction when mouth and nose are clear (due to swollen tissues)

3) Obvious swelling or bruising of neck
4) Tracheal deviation (windpipe pushed off to one side)
5) Depressions in neck
6) Obvious cuts or puncture wounds

b. Care for profuse bleeding from arteries
1) Immediately apply direct pressure with palm of your gloved hand.
2) Apply a pressure dressing, but DO NOT apply pressure to airway or to both sides of neck at once.
3) Once bleeding is controlled, place patient on left side and, if possible, in a slight head-down slant.
4) Provide care for shock.

c. Care for profuse bleeding from veins
1) Immediately apply direct pressure with palm of your gloved hand.
2) Apply an occlusive dressing, and secure on all sides with tape.
3) Position patient on his left side and, if possible, in a slight head-down slant.
4) Provide care for shock.

14. Penetrating chest wounds

a. Signs and symptoms
1) Open chest wound where chest wall is torn or punctured
2) Sucking sound being made each time patient breathes
3) Patient is coughing up bright red, frothy blood.

b. Care for penetrating chest wound with no impaled object
1) Have dressing materials ready; don PPE.
2) Seal wound with gloved hand as patient exhales.
3) Apply occlusive dressing under your hand while patient exhales. Hold it in place.
4) Seal dressing by taping on three sides (follow local protocols).
5) Provide oxygen, and maintain body temperature.

c. Care for penetrating chest wound with impaled object
1) DO NOT remove object.
2) Stabilize object
3) Place bulky dressings on opposite sides of object.
4) Add perpendicular layers of dressings to first layer; continue alternating layers to about three-quarters of object length.
5) Secure dressings in place with tape or wide cravats.

15. Abdominal injuries

a. Signs of abdominal injuries
1) Deep cuts or puncture wounds to abdomen, pelvis, lower back
2) Indications of blunt trauma to abdomen or pelvis
3) Pain or cramps in abdominopelvic region
4) Patient is protecting or guarding abdomen.
5) Patient is lying still with legs drawn up to chest.
6) Rapid, shallow breathing, rapid pulse
7) Rigid and/or tender abdomen

b. Emergency care
1) Dress all open wounds.
2) Position patient on his back with legs flexed if there are no signs of injury to pelvis or lower limbs.

3) Care for shock.
4) Be alert for vomiting.
5) Be certain that you do not touch any exposed internal organs; cover them with occlusive dressing, such as plastic wrap, and

then bulky dressings to maintain warmth.

6) DO NOT remove impaled objects. Stabilize with bulky dressings.

16. Injury to the genitalia

a. Types of injuries

1) Blunt trauma injury-usually painful and can be relieved by an ice pack wrapped in a towel placed on site.

2) Cuts-bleeding can be controlled with direct pressure and application of a bulky dressing held in place with triangular bandage.

b. Other care

1) DO NOT remove impaled objects.

2) Save and wrap avulsed parts, and keep them cool.

3) Conduct all care procedures as you would for an injury to any other part of the body.

LESSON NINE

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

BURNS

A. Classifying burns

1. Causes (or sources) of burns

a. Heat (thermal)-including fire, steam, and hot objects

b. Chemicals-including various caustics such as acids and alkalis

c. Electricity-including electrical outlets, frayed wires, and faulty circuits.

d. Light-including burns to eye caused by intense light sources and burns to skin or eyes caused by ultra-violet light such as sunlight

e. Radiation-usually from nuclear sources. (Ultraviolet light may also be considered as a source of radiation burns.)

2. Severity or degree of damage to the skin

a. First-degree (superficial) burns

1) Only the top layer of skin is burned.

2) Skin becomes reddened, has some swelling, and is usually painful.

b. Second-degree (partial-thickness) burns

1) Some damage to deeper layers of skin.

2) Skin blisters.

3) Swelling occurs within 48 hours.

4) Extremely painful.

c. Third-degree (full-thickness) burns

1) All layers of skin are burned.

2) Skin usually is dry, pale or white but may be brown or charred.

3) Loss of sensation in the area due to destruction of nerve endings.

B. Evaluating the extent of burns

1. "Rule of Nines"-provides a means of estimating the percentage of the body that is burned.

a. For an adult:

1) Head and neck, 9%

2) Chest, 9%

3) Abdomen, 9%
4) Each arm, 9%
5) Each leg, front, 9%
6) Each leg, back, 9%
7) Upper back, 9%
8) Lower back, 9%
9) Buttocks, 9%
10) Genital area, 1%

b. For an infant or a child:

1) Head and neck, 18%
2) Each arm, 9%
3) Chest and abdomen, 18%
4) Entire back, 18%
5) Each leg, 14%
6) Genital area, 1%

2. Rules for First Responder Care

a. Perform initial and focused assessments; provide BLS as needed.
b. Monitor vital signs, especially respiration.
c. Provide care for all burns.
d. Alert dispatch.
e. Burns (other than sunburn) that involve hands, feet, face, groin, buttocks, medial thighs, or major joints should be seen by more highly trained EMS personnel.
f. Burns (other than sunburn) that encircle a body part should be seen by more highly trained EMS personnel.
g. When in doubt, over classify.
h. Consider burn to be more serious if patient:

1) Is a child (very serious if under 10)
2) Is elderly (very serious if over 50)
3) Has other injuries or medical condition
4) Has a partial- or full-thickness burn of more than 10% of skin surface (very serious)

C. Emergency care

1. Thermal burns

a. Complete scene size-up before initiating care.
b. Alert dispatch.
c. Perform initial assessment.
d. Minor burns

1) Flush with cold water or use running cold water over site. Keep cold water on burn for several minutes.
2) Wrap burn with a sterile or clean, loose dressing.

e. Major burns

1) DO NOT flush with water if burn involves 9% or more of total body surface area.
2) Stop the burning process; remove smoldering clothes or jewelry.
3) Maintain an open airway-Make certain that patient is breathing. Check respiratory rate and character.
4) Cover entire burn-Use sterile clean dressing or sheet.
5) DO NOT obstruct mouth and nose.
6) DO NOT apply any burn ointments.
7) DO NOT break blisters.
8) Give special care to the eyes.

a) If eyelids or eyes have been burned, cover eyelids with sterile pads.
b) If sterile water is available, moisten pads before applying them to patient's eyelids.

9) Give special care to fingers and toes.
- **a)** Never dress fingers or toes having serious partial-thickness (second-degree) or any full-thickness (third-degree) burns without first inserting sterile or clean pads between each finger or toe.
- **b)** If sterile water is available, moisten these pads.
- **c)** A slight elevation of legs in cases of burns to feet and slight elevation of arms if burns are to hands is recommended.

10) Provide care for shock.

2. Chemical burns
- **a.** Alert dispatch.
- **b.** Evaluate scene for safety.
- **c.** Flood area of burn with water for at least 20 minutes.
- **d.** Apply dressings to affected area: remove dressing and rewash if necessary.
- **e.** Dry lime should be brushed from the site, NOT flooded.
- **f.** Burns to eyes require special care:
  - **1)** Alert dispatch.
  - **2)** Immediately flood eyes with water.
  - **3)** Keep running water from a faucet (low pressure), bucket, cup, bottle, or other such source flowing into the burned eye. You may have to hold patient's eyelids open.
  - **4)** Continue washing eye for at least 20 minutes.
  - **5)** After washing patient's eyes, cover both eyes with moistened pads.
  - **6)** Remove pads and wash patient's eyes for five more minutes if patient begins to complain about increased burning sensations or irritation.

3. Electrical burns
- **a.** Perform scene size-up, including scene safety.
- **b.** Assure BSI.
- **c.** Perform initial assessment.
- **d.** Alert dispatch.
- **e.** Make certain that you and patient are in a safe zone.
- **f.** Check breathing and pulse-electrical energy passing through a patient's body can cause cardiac arrest. Many electrical shock patients will have partial airway obstruction due to swollen tissues along the airway.
- **g.** Evaluate burn-look for at least two burn sites-one where patient came into contact with energy source (often, the hand), the other where patient came into contact with the ground (often, a foot or hand).
- **h.** Apply dry, sterile or clean dressings to burn sites. If burn involves less than 9% of the body, moisten dressings with sterile water.
- **i.** Care for shock.

4. Infants and children
- **a.** Children have greater skin surface in relation to total body size-more areas burned.
- **b.** Greater surface area, the greater fluid and heat loss
- **c.** Keep environment warm.
- **d.** Consider possibility of child abuse.

LESSON TEN
DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

***** GIVE THE STUDENTS A QUICK INTRUDUCTION TO THE MUSCULOSKELETAL SYSTEM***

A. Muscles, bones, joints, connective tissues, blood vessels, and nerves make up musculoskeletal system.

B. Injuries may show same signs and symptoms-typically pain, swelling, and deformity.

C. Not necessary for First Responders to determine exact type of injury but will classify injuries to extremities as painful, swollen, deformed (PSD) extremities.

D. Such injuries are usually the result of trauma.

THE MUSCULOSKELETAL SYSTEM

A. Functions

1. Bones support body and give it form and rigid structure for attachment of muscles.

2. Muscles attached to skeleton by ligaments permit motion at most places where bones join together (joints).

3. Protects body organs

a. Skull protects brain.

b. Rib cage protects heart and lungs.

c. Lower ribs protect much of liver and spleen.

d. Spinal vertebrae protect spinal cord.

4. Some bones function in blood cell production.

B. Main parts of skeletal system

1. Axial skeleton-all bones forming upright axis of body (skull, backbone, breastbone, and ribs)

2. Appendicular skeleton-all bones forming upper and lower extremities (collarbones, shoulder blades, bones of arms, wrists, hands, and bones of the pelvis, legs, ankles, and feet)

a. Upper extremity

1) Shoulder girdle-upper extremities are attached to shoulder girdle-formed largely by the shoulder blade (scapula) and collarbone (clavicle).

2) Arm (shoulder to elbow)-one bone: humerus

3) Forearm (elbow to wrist)-two bones: radius on thumb side and ulna on little finger side

4) Hand-many bones including those of wrist and fingers

b. Lower extremity

1) Pelvis-bony ring formed by sacrum and two pelvic bones

2) Hip joint-lower extremity attached to pelvis at hip joint

3) Upper leg (thigh)-one bone: femur; longest, heaviest, and strongest bone of body. Femur fractures are serious.

4) Lower leg-two bones: tibia in front and fibula in back

5) Foot-many bones

6) Kneecap-one bone: patella

INJURIES TO EXTREMITIES

A. Causes of injuries

1. Direct force

2. Indirect force

3. Twisting force

4. Aging and disease

B. Types of injuries

1. Painful, swollen, deformed injuries to extremities caused by trauma

2. Closed-no break in skin; soft-tissue damage with internal bleeding; few or no external signs of injury

3. Open-soft-tissue damage is evident; bone may tear through skin.

4. Fractures occur any time a bone is broken, chipped, cracked, or splintered.
5. Dislocation-pushing or pulling of a bone end partially or completely from a joint
6. Sprain-partially torn ligament, usually result of twisting force
7. Strain-overstretching or tearing of a muscle, usually result of overexerting or overworking the muscle
8. Angulated fracture-fracture causes bone or joint to take an unnatural shape.

C. Signs and symptoms of injuries to bones and joints

1. Main signs and symptoms

a. Pain-nerves are pressed by swelling and broken bone ends.
b. Swelling-blood from ruptured vessels collects inside the tissues.
c. Deformity-limb appears different in size or shape when compared to other limb.

2. Other common signs and symptoms

a. Loss of use, or a locked joint
b. Numbness or tingling sensation
c. Loss of distal pulse
d. Slow capillary refill
e. Grating
f. Sound of breaking
g. Exposed bone

D. Total patient care

1. Perform scene size-up.
2. It is necessary to care for injuries in certain order:

a. Airway, breathing, circulation, major bleeding, and shock
b. Spinal injuries
c. Skull injuries
d. Pelvic injuries
e. Thigh injuries
f. Rib cage or chest injuries
g. Extremity injuries with no distal pulse
h. Injuries to arm, lower leg, and individual ribs

3. Patient care steps

a. Perform initial assessment before you focus on a particular injury.
1) Manage life-threatening problems first.
2) Prioritize and manage other injuries.
b. Expose injury site.
1) Dress open wounds.
2) Check distal pulse, sensation, motor function.
c. Immobilize extremity.
d. Apply cold pack to help control bleeding and reduce swelling.
e. Care for shock-give oxygen per local protocols.
f. Maintain body temperature.

SPLINTING

A. Purpose-immobilize and stabilize painful, swollen, deformed (PSD) extremities
B. Why splint?
1. To reduce pain
2. To reduce further possible injuries to soft tissues
3. To reduce and control bleeding
4. To relieve pressure against vessels
5. To prevent closed injuries from becoming open injuries
C. Types of splints
1. Soft

2. Rigid

D. Sling and swathe

1. Descriptions

a. Sling-triangular bandage that supports shoulder and arm

b. Swathe-triangular bandage folded to 4-6 inches; used to hold arm against side of chest

c. Cravat-triangular bandage folded to 3-4 inches; used to tie splints in place

2. Uses-immobilization, support, elevation

a. Shoulder girdle injuries

b. Upper arm injuries

c. Elbow injuries

d. Lower arm injuries

e. Wrist, hand, finger injuries

f. Fractured ribs

3. Application

a. Sling

b. Swathe

E. First Responder responsibilities

1. Do only what you have been trained to do.

2. Care for life-threatening injuries first.

3. DO NOT move patient to splint unless you have appropriate help.

4. If mechanism of injury or signs and symptoms indicate the need, use following splinting techniques where appropriate:

a. Sling and swathe (soft splint)

b. Rigid splints for injuries to forearm, wrist, thigh, lower leg

c. Soft or rigid splints for injuries to upper arm, elbow, wrist, hand

d. Soft splints for ankle, foot

e. Splint when in doubt.

F. Rules for splinting

1. Reassure patient and explain what you will do.

2. Splint before moving patient unless environment is threatening.

3. Expose injury site.

4. Control all serious bleeding, but do not apply pressure over injury site.

5. Dress open wounds.

6. Check for distal pulse, sensation, and motor function before and after splinting.

7. Have all splinting materials ready, and use a padded splint for comfort.

8. Attempt to realign an angulated limb or reposition it to regain a pulse.

9. Apply gentle manual traction, and secure splint firmly.

10. Immobilize injured extremity and joints above and below injury site.

11. Secure splint from distal to proximal end of extremity, leaving fingertips and toes exposed.

12. Elevate extremity if there are no spinal injuries.

13. Provide care for shock.

G. Applying manual traction

1. DO NOT apply manual traction if injury involves major joints-shoulder, elbow, wrist, hand, pelvis, hip, knee, ankle, foot.

2. Once applied, manual traction must be maintained until splint is firmly secured. One rescuer applies manual traction and maintains it. Another rescuer applies and secures splint.

H. Straightening angulated fractures

1. DO NOT attempt to straighten open angulated fractures.

2. DO NOT attempt to straighten angulated fractures or dislocations of wrist and shoulder.

3. DO NOT attempt to straighten angulated fractures of shoulder, pelvis, hip, thigh, wrist, hand, foot, or a joint immediately above or below injury site.
4. Straighten closed angulated fractures of elbow, knee, and ankle if there is no distal pulse. DO NOT apply manual traction. Align for splinting.
5. Make only one attempt to straighten angulations. Stop if limb offers resistance or if patient complains of pain.

I. Types of splints
1. Commercial splints
2. Inflatable splints
3. Improvised emergency splints

***** Summarize the skeletal system with the students.**
****** Have students practice splinting fingers, wrists, forearms, arms and shoulders********
You can use the NREMT candidate for small bone splinting to help the students and serve as a rubric.

LESSON ELEVEN

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

MANAGEMENT OF UPPER EXTREMITY INJURIES

A. Shoulder girdle
1. "Knocked down" shoulder
2. Arm held away from body; sharp prominence in front of shoulder
3. DO NOT try to realign or reposition angulations or dislocations of shoulder.

B. Upper arm bone
1. Injury can occur to proximal end, midshaft area, or distal end.
2. Regardless of location, care is same: apply a sling and swathe, but modify sling to a wrist sling. Arm should be in splinting position.
3. If there is no distal pulse, attempt to reposition arm if you are allowed to do so.

C. Elbow
1. Injury areas
   a. Distal humerus
   b. Dislocations of elbow joint
   c. Proximal end of lower arm (radius and ulna)
2. Care
   a. Bent position-rigid splint preferred; sling and swathe is effective.
   b. Straight position and cannot be placed in splinting (bent) position-rigid splint preferred; body splint is effective.
   c. Dislocation and arm cannot be repositioned-pad between arm and chest, add sling and swathe.

D. Forearm, wrist, and hand
1. Soft (pillow) splint, sling and swathe
2. Rigid splint, sling and swathe
3. Sling and swathe alone

E. Fingers
1. Tape to adjacent finger.
2. Soft splint with roller gauze in hand and secure in position of function.
3. DO NOT attempt to replace dislocated finger joints.

****** Have students practice splinting fingers, wrists, forearms, arms and shoulders********

You can use the NREMT candidate for small bone splinting to help the students and serve as a rubric.

LESSON TWELVE

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

MANAGEMENT OF LOWER EXTREMITY INJURIES

- **A.** Pelvic girdle
  - **1.** Indications of injuries
    - **a.** Pain in pelvis or hips
    - **b.** Pain when gentle pressure is applied to hips or hip bones
    - **c.** Cannot lift legs
    - **d.** Foot on injured side turns out
    - **e.** Noticeable deformity of pelvis or joint
  - **2.** Immobilization and stabilization methods
    - **a.** PSAG per local protocols
    - **b.** Long spine board
    - **c.** Orthopedic frame (scoop stretcher)
    - **d.** Long board splints
    - **e.** Blanket roll between legs
  - **3.** General care includes caring for shock and providing oxygen.
  - **4.** Hip dislocation
- **B.** Upper leg (thigh/femur)
  - **1.** Physiology
    - **a.** Injuries are often open.
    - **b.** In closed injuries, internal bleeding can be profuse and life-threatening.
    - **c.** Deformity can be extreme and obvious.
    - **d.** Lower leg may be angulated or appear to be twisted.
  - **2.** Splinting
    - **a.** Rigid splinting required
    - **b.** Traction splinting preferable; apply if trained to do so.
  - **3.** General care-shock management
    - **a.** Administer oxygen.
    - **b.** Maintain body warmth.
- **C.** Knee
  - **1.** Physiology
    - **a.** Difficult to distinguish between fracture and dislocation
    - **b.** Dislocation of kneecap may spontaneously reposition itself.
    - **c.** Potential for soft-tissue damage is high because of many nerves and vessels around joint.
    - **d.** Attempting to reposition may further damage soft tissues.
  - **2.** Splinting
    - **a.** Rigid splinting is most effective, especially when knee in bent position.
    - **b.** Splinting with a blanket roll is effective when leg is in straight position.
  - **3.** General care includes providing care for shock and giving oxygen.
- **D.** Lower leg
  - **1.** Rigid splint
  - **2.** Blanket roll with patient on spine board or scoop stretcher.
  - **3.** Provide care for shock.
- **E.** Ankle and foot
  - **1.** Immobilize in position found with a soft (pillow) splint and cravats.

2. Reposition angulations, especially if there is no distal pulse. (Check local protocols.) Notify dispatch.

3. Elevate foot.

LESSON THIRTEEN

******HANDS ON EDUCATION & PRACTICE*****

Divide the students into groups of four.

Students will practice bleeding control. Use the NREMT's candidate sheet for bleeding control and treatment of shock to help the students. The sheet will also be your rubric/graphic organizer.

If you have a moulage kit or a Drama department at your school, "doctor-up" a few students with various wounds and fake blood to help create a sense of realism.

***** Have students get into groups of 4 and practice using the HARE Traction splint. This splint is used for a mid-shaft, closed femur fracture. Print the NREMT candidate sheet for Traction Splinting to use as a rubric and teaching document.**

LESSON FOURTEEN

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

THE AXIAL SKELETON

A. Definition-bones and joints of skull, spine, and chest. It makes up the long axis of body.

B. Injuries can be serious-they relate to structures protected by axial skeleton, including brain, spinal cord, airway, lungs, heart.

C. Components

1. Head (skull)-divided into two major structures

a. Cranium-flat, irregularly shaped bones that are fused to make up immovable joints of floor, back, top, and sides of skull and forehead

b. Face-strong, irregularly shaped bones that are also fused into immovable joints except for lower jaw bone (mandible); includes part of eye sockets, cheeks, upper part of nose, upper jaw, lower jaw

2. Spinal column

a. Neck bones (cervical spine) and backbone, all of which protect spinal cord and support entire body.

b. Skull, shoulders, ribs, and pelvis connect to spine.

3. Chest

a. Ribs (12 pair), which attach to spine in back and sternum in front by pieces of cartilage, except for last two pair, which attach only to spine (floating ribs).

b. Upper ribs protect heart, major blood vessels leading to and from heart, lungs, trachea, and esophagus.

D. Central nervous system

1. Brain, spinal cord, and certain major nerves
2. Functions include sending information to and receiving messages from all parts of body.
3. Injury to brain or spinal cord could disrupt its functions and leave body permanently disabled.
4. Spinal cord site of many reflexes.

E. Mechanisms of injury-important indications of injury. Look for:
1. Compression injuries (falls, diving, and motor vehicle accidents)
2. Excessive flexion or bending of a body part
3. Extension or excessive stretching of a body part
4. Rotation or excessive twisting of a body part
5. Extreme side-to-side (lateral) bending
6. Spinal stretching from pulling apart or hanging
7. Axial load to the top of the head
8. Blunt trauma (struck by a car, striking steering wheel or windshield, blows)
9. Penetrating trauma (gunshot wounds, stabbings)
10. Assault and battery, or shaking of an infant
11. Any trauma situation where patient is unconscious or unresponsive

INJURIES TO THE HEAD

A. Types of injuries
1. Physiology-injuries from a variety of mechanisms can cause pain, swelling, deformity, unresponsiveness, major bleeding of scalp, and brain damage, which will affect airway and respiration.
2. Open head injuries-indications include:
a. See or feel that skull is cracked or depressed
b. See clear or yellow watery fluid leaking from ears or nose
c. See that eyelids are swollen shut and discolored
d. See openings where objects may have been forced through the skull and into brain tissue
e. See soft-tissue damage
3. Closed head injuries-serious because there is no opening from which blood or fluids can drain. Pressure builds within skull and presses on brain.
a. Skull is not damaged or cracked.
b. Brain can be damaged by force of something striking skull.
1) Concussion-may be minor (no unconsciousness), mild (brief unconsciousness), or severe (lengthy unconsciousness and abnormal vital signs). Short-term memory loss may occur.
2) Bruising (contusion)-force of blow ruptures blood vessels.

B. Signs and symptoms of head injury
1. Unresponsiveness or unconsciousness
2. Deep cuts or tears to skin
3. Penetrating injuries
4. Swelling and discoloration of skin
5. Edges or fragments of bone seen or felt through skin
6. Deformity of skull
7. Exposed brain tissue
8. Swelling and discoloration behind ears
9. Swelling or discoloration of eyelids or tissues under eyes
10. One or both eyes appear sunken

11. Unequal pupils
12. Bleeding from ears and/or nose
13. Clear or bloody fluid flowing from ears and/or nose (cerebrospinal fluid)
14. Deterioration of vital signs

C. Signs and symptoms of brain injury
1. Headache
2. Any sign of head injury
3. Loss of consciousness, unresponsiveness, or altered mental status
4. Confusion or personality changes
5. Unequal or unresponsive pupils
6. Paralysis or loss of function
7. Loss of sensations (may be to one side of body)
8. Paralysis of facial muscles (may interfere with airway and speech)
9. Disturbed or impaired vision, hearing, equilibrium
10. Nausea and/or vomiting
11. Changing patterns in respiration
12. Seizures

D. Signs and symptoms of facial injury
1. Blood in airway (nose or mouth)
2. Facial deformities
3. Swelling or discoloration
4. Swollen lower jaw, poor function, or inability to close jaw
5. Deformity or depression of any part of face
6. Loose or knocked out teeth or broken dentures
7. Any mechanism of injury that indicates a blow to face

E. Care for head injuries
1. Injuries to cranium
a. Maintain open airway. Use jaw-thrust maneuver and stabilize head.
b. Provide resuscitative measures as needed.
c. Keep patient at rest.
d. Control bleeding but DO NOT apply pressure over injury site. Apply a loose dressing to absorb flow of any cerebrospinal fluid.
e. Dress and bandage open wounds, stabilizing any penetrating objects.
f. Talk to conscious patient to keep him alert and responsive.
g. Provide care for shock. Maintain body warmth and provide 100% oxygen.
h. Monitor and record vital signs. Note and record changes.
i. Provide emotional support.
j. Be prepared for vomiting.
k. Arrange to transport as soon as possible.

2. Injuries to the face
a. Maintain an open airway.
b. Control bleeding and dress open wounds.
c. Keep patient at rest.
d. Provide care for shock.
e. Monitor patient and stay alert for vomiting.
f. Monitor and record vital signs.

INJURIES TO THE NECK AND SPINE

A. Types of injuries
1. Soft-tissue injuries
2. Injuries to bones of head and spinal cord

B. Signs and symptoms
1. Weakness, numbness or tingling sensations, or loss of feeling in arms and/or legs

2. Paralysis to arms and/or legs
3. Painful movement of arms and/or legs (or no pain or sensation)
4. Pain and/or tenderness along back of neck or backbone
5. Burning sensations along spine or in an extremity
6. Deformity
7. Loss of bladder and bowel control
8. Difficult or labored breathing with little or no movement of chest and slight movement of abdomen
9. Position of arms (above the head or curled to chest)
10. Persistent erection (priapism)

C. The focused assessment
1. Patient is conscious and responsive:
   a. Question patient about feeling, sensation, numbness, and location.
   b. Look and feel gently for injuries and deformities.
   c. See if patient can move arms and legs.
2. Patient is unconscious and unresponsive:
   a. Ask bystanders for information.
   b. Look and feel for injuries and deformities.
   c. See if patient responds to pressure on or pinching of feet and hands.

D. Care for injuries to neck and spine
1. Maintain an open airway using jaw-thrust maneuver and provide resuscitative measures as needed.
2. Control serious bleeding with as little movement of injured part or limbs as possible.
3. Assume an unconscious accident patient has neck and spinal injuries.
4. DO NOT attempt to splint fractures if there are indications of neck and spinal injuries.
5. Never move a patient with neck or spinal injuries except:
   a. To provide CPR or pulmonary resuscitation
   b. To reach life-threatening bleeding
   c. To protect yourself and patient from danger at scene
6. Keep patient at rest.
7. Continuously monitor the patient.
8. Stabilize head and neck.

HELMET REMOVAL

A. Rationale for helmet use
1. Protect brain from:
   a. Concussion
   b. Contusion
   c. Hematoma
2. State helmet laws for bicyclists and motorcyclists
3. American College of Sports Medicine

B. Types of helmets

C. Before removing helmet:
1. Remove facepiece.
2. Check patient for breathing.
3. Check for fit.

D. DO NOT remove helmet if:
1. The helmet fits well.
2. Patient is breathing.
3. Removing it may cause further injury.
4. You can stabilize with helmet in place until patient can be immobilized on spine

board.

5. Patient can be placed in neutral in-line position.
6. Helmet does not interfere with reassessment or maintaining airway and assisting breathing.
7. Patient is wearing shoulder pads.

E. Remove helmet if:

1. Helmet interferes with reassessment or maintaining airway and assisting breathing.
2. Patient's head moves inside improperly fitting helmet.
3. Helmet interferes with placing patient on spine board in neutral in-line position.
4. Patient is in cardiac arrest.

F. Helmet removal

1. First Responder #1: kneel at head of patient; stabilize patient's head.
2. First Responder #2: kneel at side of patient's shoulders; unfasten the chin strap, remove the face guard, face shield, goggles, or glasses if present.
3. First Responder #2: place one hand on the mandible at the angle of the jaw and the other hand behind the neck at the base of the skull to stabilize patient's head.
4. First Responder #1: pull sides of helmet apart and carefully slip helmet halfway off.
5. First Responder #2: maintain position of hand stabilizing the jaw; reposition at the back of the neck slightly higher on the back of the head to maintain in-line stabilization.
6. First Responder #1: finish removing the helmet and then place hands on either side of patient's head to take over in-line stabilization.
7. First Responder #1: check and clear the airway, provide ventilations, and apply a collar.

LESSON FIFTEEN

******HANDS ON EDUCATION & PRACTICE*****

Divide the students into groups of five.
Give each group one set of neck rolls or blocks, one long back board, one adjustable cervical collar and four straps.

Students will practice Spinal immobilization/supine. Use the NREMT's candidate sheet for Spinal Immobilization to help the students. The sheet will also be your rubric/graphic organizer.

LESSON SIXTEEN

******HANDS ON EDUCATION & PRACTICE*****

Divide the students into groups of four.

Give each group one C-Collar, one KED (Body Splint—Vest Type), one long back board, one adjustable cervical collar and four straps

Students will practice Spinal immobilization/sitting. Use the NREMT's candidate sheet for Spinal Immobilization/sitting to help the students.

The sheet will also be your rubric/graphic organizer.

LESSON SEVENTEEN

DISSCUSION/LECTURE/POWER POINT/VIDEOMULTIMEDIA PRESENTATION/VIDEO

INJURIES TO THE CHEST

A. Fractured ribs
- **1.** Signs and symptoms
  - **a.** Pain and tenderness at injury site
  - **b.** Deformity at site of fracture (swelling or rib displacement)
  - **c.** Increased pain at site with movement or respiration
  - **d.** Shallow breathing
  - **e.** Patient reporting a crackling sensation at injury site
  - **f.** Characteristic stance (leaning toward side of injury)
  - **g.** Guarding injury site
- **2.** Care for fractured ribs
  - **a.** Assure an airway; suction/clear mouth as necessary.
  - **b.** Provide oxygen, and maintain body temperature.
  - **c.** Keep patient at rest and monitor breathing.
  - **d.** Place forearm of injured side in sling, resting across chest.
  - **e.** Apply swathe for additional support.

B. Flail chest
- **1.** Signs and symptoms
  - **a.** Same signs and symptoms as fractured ribs
  - **b.** Failure of a section of chest wall to move with rest of chest when patient is breathing (movement is in opposite direction of inhalation and exhalation and is slight)
  - **c.** Indications that lungs and heart have been injured (blue discoloration of head, neck, shoulders, lips and tongue; bulging, bloodshot eyes; bulging neck veins; and obvious chest deformity)
- **2.** Care for flail chest
  - **a.** Locate injury site.
  - **b.** Apply and tape bulky dressings in place.
  - **c.** Provide oxygen, and maintain body temperature.
  - **d.** Monitor patient.

LESSON EIGHTEEN

******HANDS ON EDUCATION & PRACTICE*****

Divide the students into groups of four or five.

Allow students to practice any station that they feel will help them prepare for their practical evaluations during lesson nineteen.

LESSON NINETEEN

**** This day allows for summarization of the GPS and review before the units written assessment. It also allows the instructor to have addition time for a practical evaluation.**

*****It is recommended to have several EMS professionals to come in and evaluate the students by using the NREMT candidate sheets. Set up 4 stations, Spinal Immobilization Seated; Spinal Immobilization Supine; Bleeding Control/Shock Treatment; and Traction Splint. Have the students rotate through the stations.**

LESSON TWENTY

Ask students to clear their desks and use a pen or pencil.

Administer the GPS written assessment.

Grade and return.

Attachments for Learning Experiences:

Notes & Reflections:

Remediation Sheets or "Ticket out the Door"

The remediation sheet should be completed after every class to identify individual students or groups of students having difficulty demonstrating the cognitive, affective or psychomotor objectives of the lesson. The instructor should provide appropriate remediation to the individual or group before the next class. Instructors should assist students to achieve success in the program.
These sheets should be copied and placed at the end of each lesson.

First Responder Remediation Sheet

Date	Student
Area of Difficulty	
Action Plan	
Completed	

UNIT RESOURCES

Web Resources:

- **EMS-Related Organizations**
  The organizations listed below offer resources for specific EMS interests and information. Some organizations offer training opportunities through local branches. To obtain membership, dues, and participation information, write to the organization(s) most closely associated with your interests.
  This is only a sampling of EMS-related organizations. EMS journals and other EMS professionals may provide information on additional organizations.

- **American Red Cross (ARC)**
  National Disaster Response
  Contact your local Red Cross chapter

- **American Trauma Society (ATS)**
  Membership Department
  8903 Presidential Parkway, Suite 512
  Upper Marlboro, MD 20772-2656

- **FARMEDIC National Training Center**
  ATTN: Dave Oliver
  Alfred State College
  Alfred, NY 14802

- **Florida EMS Clearinghouse**
  2002 Old St. Augustine Road, Building D
  Tallahassee, FL 32301

- **International Association of Dive Rescue Specialists (IADRS)**
  P.O. Box 5259
  San Clemente, CA 92674-5259

- **International Critical Incident Stress Foundation, Inc.**
  ATTN: Team Information
  5018 Dorsey Hall Drive, Suite 104
  Ellicott City, MD 21042

- **National Association For Search And Rescue**
  4500 Southgate Place, Suite 100
  Chantilly, VA 22021

- **National Association of Emergency Medical Technicians (NAEMT)**
  102 West Leake Street
  Clinton, MS 39056

- **National Association of EMS Physicians (NAEMSP)**
  230 McKee Place, Suite 500
  Pittsburgh, PA 15213

- **National Flight Paramedic's Association**
  35 South Raymond Avenue, Suite 205
  Pasadena, CA 91105

- **National Registry of Emergency Medical Technicians (NREMT)**
  ATTN: First Responder Department
  6610 Busch Boulevard
  Columbus, OH 43229

- **Air Medical Physician Association**
  (AMPA) Ms. Pat Petersen, Executive Director
  383 F St. Salt Lake City, UT 84103
  website: www.ampa.org.

- **Association of Air Medical Services** (AAMS)
  Ms. Dawn Mancuso, Executive Director
  110 North Royal St., Suite 307
  Alexandria, VA 22314
  703 836 8732; fax 703 836 8920
  e-mail: dmancuso@aams.org website: www.aams.org.

- **National EMS Pilots Association** (NEMPSA)
  Ms. Dawn Mancuso, Executive Director
  110 North Royal St., Suite 307
  Alexandria, VA 22314
  703 836 8732; fax 703 836 8920
  e-mail: dmancuso@aams.org
  website: www.nemspa.org.

- A**ir & Surface Transport Nurses Association**
  (ASTNA) Ms. Karen Wojdyla, Executive Director 9101 E. Kenyon Ave., Suite 3000
  Denver, CO 80237
  303-770-2220; fax 303-770-1812
  e-mail: info@gwami.com
  website: www.astna.org.

- **National Flight Paramedics Association**

(NFPA) Ms. Pat Petersen, Executive Director 383 F St. Salt Lake City, UT 84103
801 381 NFPA; fax 801 321 1668
website: www.nfpa.rotor.com.

- http://health.state.ga.us/programs/ems/offices
  www.mosbyjems.com
- www.dhs.gov
- www.nhtsa.dot.gov
- www.lungusa.org
  www.innerbody.com
- www.spinalcord.org
  www.emsmagazine.com
- www.childbirth.org
  www.amhrt.org
- www.techrescue.org
  www.jems.com

- www.nremt.org
- www.osha.gov
- www.cdc.gov

Attachment(s):

Materials & Equipment:

AV Equipment: Use various audiovisual materials relating to bleeding and shock (hypoperfusion). The continuous design and development of new audiovisual materials relating to First Responder requires careful review to determine which best meet the needs of the program. Materials should be edited to ensure meeting the objectives of the curriculum.

EMS Equipment: Sterile dressings, bandages, splints, triangular bandage, , gloves, eye protection, blankets. Also, universal dressings, occlusive dressings, 4 □ 4 gauze pads, self-adherent bandages, roller bandages, triangular bandages, burn sheets, sterile water or saline.

Splints: Padded arm and leg, air, traction, cardboard, ladder, blanket, sticks or rods, air splints, pillows, improvised splinting material (e.g., magazines).

Long spine boards, short spine immobilization device (KED), cervical immobilization devices, helmet, head immobilization device, blanket roll, 2-inch tape.

Additional Materials: Stethoscope, blood pressure cuff, penlight, oxygen, non-rebreather O2 mask.

Images of varied mechanisms of injury, padding, straps, KED, XP1, images of open and closed head injuries, infant and child mannequins, pediatric immobilization equipment

Illustrations and model of skeleton

What 21st Century Technology was used in this unit:

X	Slide Show Software		Graphing Software		Audio File(s)
	Interactive Whiteboard		Calculator		Graphic Organizer
	Student Response System		Desktop Publishing		Image File(s)
	Web Design Software		Blog	X	Video
	Animation Software		Wiki		Electronic Game or Puzzle Maker
	Email	X	Website		