Chapter 48
Spinal Trauma

Learning Objectives

- Describe the incidence, morbidity, and mortality rates of spinal injuries in the trauma patient

Learning Objectives (Cont'd)

- Describe the anatomy and physiology of the following structures related to spinal injuries:
  - Cervical
  - Thoracic
  - Lumbar
  - Sacrum
  - Coccyx
  - Spinal cord
  - Nerve tract
  - Dermatome
Learning Objectives (Cont'd)

- Predict spinal injuries on the basis of the mechanism of injury
- Describe the pathophysiology of spinal injuries
- Explain traumatic and nontraumatic spinal injuries

Learning Objectives (Cont'd)

- Describe assessment findings associated with spinal injuries
- Integrate pathophysiological principles to the assessment of a patient with a spinal injury
- Differentiate spinal injuries on the basis of assessment and history

Learning Objectives (Cont'd)

- Formulate a field impression on the basis of assessment findings
- Develop a patient management plan on the basis of the field impression
- Describe assessment findings associated with traumatic spinal injuries
Learning Objectives (Cont'd)

- Describe the management of spinal injuries
- Integrate pathophysiological principles to the assessment of a patient with a traumatic spinal injury
- Describe the pathophysiology of a traumatic spinal injury related to the following:
  - Spinal shock
  - Neurogenic shock

- Using the patient history and physical examination findings, develop a treatment plan for the following:
  - Concussion
  - Diffuse axonal injury
  - Cerebral contusion
  - Epidural hematoma
  - Subdural hematoma
  - Intracerebral hemorrhage
  - Subarachnoid hemorrhage

- Describe the pathophysiology of traumatic spinal injury related to the following:
  - Tetraplegia, paraplegia
  - Incomplete cord injury, cord syndromes
  - Central cord syndrome
  - Anterior cord syndrome
  - Brown-Séquard syndrome
  - Cauda equina syndrome
  - Conus medullaris syndrome
  - Spinal cord injury without radiological abnormality
Learning Objectives (Cont'd)

- Differentiate traumatic and nontraumatic spinal injuries on the basis of assessment and history
- Describe the pathophysiology of nontraumatic spinal injury, including:
  - Low back pain
  - Herniated intervertebral disk
  - Spinal cord tumors
  - Degenerative disk disease
  - Spondylosis

Learning Objectives (Cont'd)

- Describe the assessment findings associated with nontraumatic spinal injuries
- Describe the management of nontraumatic spinal injuries
- Integrate pathophysiological principles to the assessment of a patient with a nontraumatic spinal injury

Learning Objectives (Cont'd)

- Formulate a field impression for a nontraumatic spinal injury on the basis of assessment findings
- Develop a patient management plan for a nontraumatic spinal injury on the basis of a field impression
Incidence, Morbidity, and Mortality Rates of Spine Trauma

- 11,000 new cases annually
- Typical patient, 28-year-old white man
- Cervical spine injury
- MVCs

Spinal Anatomy and Physiology

- Spinal column
  - 33 bones, vertebrae
  - Identified by region, given number

Spinal Anatomy and Physiology (Cont'd)

- Spinal column
  - Vertebreal body
    - Weight-bearing of spine
  - Vertebreal arch
    - Posterior, much smaller
    - Connection point for muscles, ligaments
    - Allows movement, acts as lever for muscles
    - Site of interlocking articulation between multiple vertebrae
    - Thoracic vertebrae articulate with ribs
Spinal Anatomy and Physiology
(Cont’d)

- Spinal column
  - Posterior vertebrae
    - Transverse process
    - Superior articular process
    - Inferior articular process
    - Spine
    - Lamina

- Atlas/first vertebra
  - Support head
  - Nod, rotate left, right
  - Lack of vertebral body

Spinal Anatomy and Physiology
(Cont’d)

- Spinal column
  - Posterior vertebrae
    - Transverse process
    - Superior articular process
    - Inferior articular process
    - Spine
    - Lamina
Spinal Anatomy and Physiology (Cont'd)

- Spinal column
  - Axis/second vertebra
    - Supports head
    - Odontoid process, protrudes superiorly
  - Ligaments
    - Support during flexion, extension
    - Between laminae, support during lateral flexion
  - Vertebral foramen
    - Between vertebral body and arch
    - Forms large canal the length of the spinal column
    - Spinal cord housed

Spinal Anatomy and Physiology (Cont'd)

- Spinal cord
  - With brain, CNS
  - Leaves skull through foramen magnum, extends through spinal column
  - Conus medullaris
  - Cauda equina
Spinal Anatomy and Physiology (Cont'd)

- Spinal cord
  - Central canal surrounded by white, gray matter
    - Gray matter
    - White matter

- Ascending tracts
  - Fasciculus gracilis and fasciculus cuneatus
  - Conduct sensations of discrimination
  - Proprioception
  - Travel same side of spinal cord as impulses
  - Cross at medulla
  - Ipsilateral deficits
Spinal Anatomy and Physiology (Cont’d)

- Spinal cord
  - Ascending tracts
    - Anterior tract transmits crude touch, pressure
    - Lateral tract transmits tickle, itch, pain, temperature sensations
    - Travel opposite side of impulses received
    - Contralateral deficits
  - Posterior tract fibers
  - Anterior tract fibers

- Spinal Anatomy and Physiology (Cont’d)

- Descending tracts
  - Corticospinal tracts
    - Pyramidal tracts
    - Originate in cortex, descend through anterior and lateral funiculi
    - Transmit impulses at level of medulla, becoming the lateral corticospinal tract
    - Fibers that do not cross at the medulla continue down same side originated
    - Anterior fibers, travel opposite side of origination, neck, upper thoracic region
Spinal Anatomy and Physiology (Cont’d)

- Spinal cord
  - Descending tracts
    - Corticospinal tracts
      - Transmit motor impulses from cortex to spinal nerves, distributed to voluntary muscles
      - Majority terminate at interneurons near gray matter of spinal cord
      - Fibers responsible for fine motor function of fingers, hands, fine motor control
      - Ipsilateral deficit
    - Some degree of movement and posture
    - Control sweat glands
    - Lateral tract
      - Cross opposite side, travel down to lateral funiculi
      - Control muscle coordination, posture

Spinal Anatomy and Physiology (Cont’d)

- Spinal cord
  - Descending tracts
    - Corticospinal tracts
      - Lie outside pyramidal system
      - Some degree of movement and posture
      - Control sweat glands
      - Lateral tract
      - Medial tract
      - Cross opposite side, travel down to lateral funiculi
      - Control muscle coordination, posture

Spinal Anatomy and Physiology (Cont’d)

- Meninges
  - Protect entire CNS
  - CNS-PAD
    - Pia mater
    - Arachnoid layer
    - Dura mater
Spinal Anatomy and Physiology (Cont’d)

- Spinal nerves
  - Peripheral nervous system, one-way signal pathways to/from spinal cord to other body tissues
  - Nerve roots leave spinal cord, distribute autonomic information and motor signals along organized pathway to signal body region
  - Pathway collects sensory signals, transmitted back to CNS
  - Pathway innervated by 31 pairs of spinal nerves
  - Myotome

Spinal Anatomy and Physiology (Cont’d)

- Dermatome
  - Skin region, spinal nerve innervates
  - Injuries result in impairment of motor, sensory skills, numbness, tingling following path of dermatome
  - Injured nerves, motor impairment, sensory impairment
  - Musculoskeletal injuries, neurovascular bundle impairment
Spinal Anatomy and Physiology (Cont'd)

Mechanism of Injury

- Principles
  - Any object in motion stays in motion in a straight line unless an outside force causes motion shift
  - Speed, mass, weight factors in energy diffusion
  - Greater force, greater injury potential
  - Lack of neurological deficit does not rule out spinal cord injury (SCI)

Mechanism of Injury (Cont'd)

- Obvious mechanism of injury
  - MVC with significant vehicle damage
  - MVC, head strikes windshield
  - Moving vehicle dejection
  - Pedestrian strike
  - Motorcycle crash
  - Fall from more than three times the patient’s height
  - Contact sports injuries
  - Shallow water diving injury
Mechanism of Injury (Cont’d)

- Uncertain mechanism of injury
  - Question patient, bystanders, emergency responders
  - None, full spine stabilization not required
  - Thorough spine assessment if cannot determine no mechanism of spine injury exists

Mechanism of Injury (Cont’d)

- Comorbid factors
  - Medical conditions, increase potential for injury
  - Age
  - Low bone density
  - Spinal stenosis
  - Multiple current medical conditions
  - Rheumatoid arthritis
  - Down syndrome
  - Neck dystonia, torticollis
  - Congenital neck abnormalities

Spinal Injury Assessment

- General assessment of spine-injured patient
  - Scene size-up
  - Control head, shoulder, hip movement
  - Open airway with jaw thrust without head tilt
  - Cervical collar
Spinal Injury Assessment (Cont’d)

- Specific assessments to determine spine injury
  - Detailed spine assessment
  - Reliable patient
  - Clear history
  - Clear physical
  - All 3 present to rule out spine injury
  - Asymmetry, equal resistance
  - Lower extremity motor function

- Sensory examination
  - Soft, light touch at distal end of each extremity
  - Free nerve endings
  - Meissner corpuscle

- Unnecessary immobilization
  - Increased patient discomfort
  - Impaired ventilatory ability
  - Increased soft tissue injury risk
  - Increased healthcare professional safety risk
  - Hospital staff difficulties examining patient
Spinal Injury Assessment (Cont’d)

- Specific assessments to determine spine injury
  - Further spinal cord injury assessments
    - Dermatome
    - Babinski’s sign
    - Strength scale

Spinal Injury Assessment (Cont’d)

- Specific assessments to determine spine injury
  - Assessing pediatric patient with potential spine injury
    - Less force needed for injury
    - Injury without fracturing vertebra
    - Susceptible to whipping forces
    - <8 years, upper cervical SCI
    - Feet to head assessment
    - Caregiver close
    - Cannot communicate, spinal immobilization

Spinal Injury Assessment (Cont’d)

- Specific assessments to determine spine injury
  - Assessing older adult with potential spine injury
    - Osteoporosis, arthritic joints, slowing reflexes cause falls
    - Sense pain less from prior nerve damage, aging
    - Stroke, TIA, hypoglycemia, Parkinson’s disease can mimic SCI
    - When in doubt, immobilize
Spinal Injury Assessment (Cont’d)
• Specific assessments to determine spine injury
  ➢ Assessing pregnant patient with potential spine injury
    • Avoid supine position
    • Last menstrual cycle
    • First pregnancy?
    • Other children
    • Prenatal care
    • Pregnancy problems
    • Due date

Spinal Injury Assessment (Cont’d)
• Specific assessments to determine spine injury
  ➢ Assessing obese patient with potential spine injury
    • Estimate mass, breathing ability in supine position
    • Exceed equipment weight limitations
    • Effectively secure to device
    • Restrict patient movement

Spinal Injury Assessment (Cont’d)
• Specific assessments to determine spine injury
  ➢ Assessing special needs patient with potential spine injury
    • Preexisting paralysis may re-injure, easily overlooked
    • Handicapped driving specialized vehicles, extrication difficult
    • Cognitive learning disability
Spinal Injury Assessment (Cont’d)

- Specific assessments to determine spine injury
  - Ongoing assessment
    - Vital signs 15-minute intervals
    - Splinting, recheck PMS
    - Motor, sensory skills after immobilization
    - Document findings

Pathophysiology of Spinal Injury

- Direct trauma
- Spinal cord swells, sustain laceration, complete transaction, puncture
- Fragmented bone pieces

Pathophysiology of Spinal Injury (Cont’d)

- Exaggerated movements
  - Flexion and extension
    - Normal forward, backward spine movement
    - Abnormal causes muscle, soft tissue injury
  - Hyperflexion and hyperextension
    - Extreme forward, backward movement
    - Rupture stabilizing tendons, ligaments
    - Stretch spinal cord
    - MVX, lip prints on shirt
    - Lateral bending
Pathophysiology of Spinal Injury (Cont'd)

- Exaggerated movements
  - Rotation
    - Abnormal twist of spinal column beyond normal rotating range
  - Direct blow
  - Lumbar, thoracic areas

Pathophysiology of Spinal Injury (Cont'd)

- Exaggerated movements
  - Axial loading (vertical compression)
    - Compression forces squeeze vertebrae together
    - Crushes 1+ vertebra, squeezes intervertebral disks
    - Frequent heavy lifting
    - Fall from significant height, lands on feet
Pathophysiology of Spinal Injury (Cont'd)

- Exaggerated movements
  - Distraction
    - Opposite of compression
    - Pulled in opposite directions
    - Stretching, separation of spinal column, ligaments, muscles, spinal cord tearing
    - Hangman's fracture
    - Mixed mechanisms

Pathophysiology of Spinal Injury (Cont'd)

- Other mechanisms
  - Blast injuries
  - Swift water, severe weather
  - Electrocution
  - Lightning strike

Types of Spine Injury

- Spinal column injuries
  - Deformity
  - Dislocation
  - Spine tenderness
  - Spine pain
Types of Spine Injury (Cont’d)

- Spinal cord injuries
  - Primary injury
    - Direct insult
      - Immediate mechanical disruption, distraction, transaction of cord
      - Spinal column injury occurs
  - Secondary injury
    - Cord concussion
      - Penetrating
      - Direct blow
    - Transient neurological deficit
      - No structural damage
Types of Spine Injury (Cont’d)

- Spinal cord injuries
  - Secondary injury
    - Cord compression
    - Soft tissues around cord swell
    - Ischemia to compressed cord part
    - Possible permanent damage

- Secondary injury
  - Laceration
    - Cut nerve bundles
    - Significant bleeding, swelling
    - Small, some recovery
    - Large, permanent damage

- Complete cord transection
  - Completely eliminates ability to send/receive nervous system impulses distal to injury site
  - Permanent, irreparable, paralysis
  - Above T1, quadriplegia/paraplegia
  - Below T2, paraplegia
Types of Spine Injury (Cont’d)

- Spinal cord injuries
  - Incomplete cord transaction
    - Portion damaged, some nervous bundles remain intact
    - Anterior cord syndrome
      - Death of anterior portion of spinal cord
      - Anterior spinal artery disrupted
      - Anterior cord infarction
      - Some paralysis, loss of pain/temperature sensation below site
      - Posterior column intact
    - Central cord syndrome
      - Hemorrhage in central part of spinal cord, spinal cord necrosis
      - Neck hyperextension
      - Symptoms
      - Burning sensation in extremities
  - Brown-Sequard syndrome
    - Penetrating trauma
    - Disk herniation
    - One-half of spinal cord affected, hemiectomy
    - Spinal cord tumors
    - Spinal epidural hematomas
    - Signs/symptoms
Types of Spine Injury (Cont'd)

- Spinal cord injuries
  - Other cord injuries and conditions
    - Spinal cord ends at L2 and L3
    - Lower lumbar region injury
    - Conus medullaris syndrome
    - Cauda equina syndrome

Types of Spine Injury (Cont'd)

- Spinal cord injuries
  - Other cord injuries and conditions
    - Spinal cord injuries without radiological abnormality
      - Injury not seen on radiographs
      - Detected through assessment

Types of Spine Injury (Cont'd)

- Spinal cord injuries
  - Other cord injuries and conditions
    - Shock in spinal cord injury
      - Blood vessels distal to transaction dilate
      - Mottled, warm, flushed skin distal to transaction
      - Bradycardia
      - Neurogenic shock
Types of Spine Injury (Cont'd)

- Spinal cord injuries
  - Other cord injuries and conditions
    - Autonomic dysreflexia syndrome
      - Medical emergency
      - Intact sensory nerves distal to SCI transmit signals to sympathetic nervous system
      - Massive vasoconstriction, hypertension above injury
      - Seizures
      - Retinal, cerebral hemorrhage
      - Acute MI
      - Piloerection
      - Headache
      - Diaphoresis
      - Visual disturbances
      - Foley catheter

General Management of Spinal Injuries

- Spinal stabilization, immobilization techniques
  - Principles
    - Stabilize head, weight centers
    - Person at head calls movements
    - Appropriately sized cervical collar early
    - Move in small increments
    - Axial movements safer than lateral movements
    - Bring spine into neutral in-line position as soon as safely possible
    - Properly fill in voids with padding

General Management of Spinal Injuries (Cont’d)

- Spinal stabilization, immobilization techniques
  - Head stabilization
    - Once head control, cannot release until completely secure
    - Directs moves
    - Closely monitor consciousness level, airway, ventilatory rate, depth, quality
    - Do not release head
    - Fasten torso, voids filled
    - Secure shoulders, hips, legs
General Management of Spinal Injuries (Cont’d)

- Spinal alignment
  - Return to natural anatomic in-line position
  - Spinal foramen has largest opening
  - Align three weight centers
  - Picture straight line running through hips, shoulders, must be parallel to each other, perpendicular to spine
  - Align shoulders, hips before head
  - Support head’s weight, do not pull

General Management of Spinal Injuries (Cont’d)

- Manual in-line stabilization
  - Grasp head between hands, fingers/thumbs extended
  - No traction exerted
  - From front, less anxiety
  - Sometimes not possible
  - Do not move if moving compromising airway/ventilations, initiates spasms in neck, pain, neurological deficit
  - SAM splint per medical direction
General Management of Spinal Injuries (Cont’d)

- Measuring and applying rigid cervical collar
  - Reduces neck flexion, extension
  - Does not prevent turning
  - Once applied, patient speaks easily

General Management of Spinal Injuries (Cont’d)

- Application of half board and vest devices
  - Cervical spine, upper thoracic column immobilization
  - Stable, seated position
  - Contraindicated for unstable, unsafe positions
Skill 48-1: Seated Spinal Immobilization

- Standard precautions
- Apply rigid cervical collar of appropriate size

Skill 48-1: Seated Spinal Immobilization (Cont’d)

- Lean patient forward to create void between his or her back and seat
- Slide vest device into void

Skill 48-1: Seated Spinal Immobilization (Cont’d)

- Lean patient back against seat
- Secure device to patient, torso first
- Secure legs
Skill 48-1: Seated Spinal Immobilization (Cont'd)

- Secure head to device, not to board
- Bring board to head
- Pad behind head

Skill 48-1: Seated Spinal Immobilization (Cont'd)

- Reassess distal pulses, movement, sensation in extremities

Skill 48-1: Seated Spinal Immobilization (Cont'd)

- Loosen top chest strap
- Secure patient to long board
- Secure patient and board to stretcher
Skill 48-1: Seated Spinal Immobilization (Cont’d)

- Once secure, transfer patient to long board

General Management of Spinal Injuries (Cont’d)

- Rapid extrication
  - Life-threatening problem
  - Hazardous, imminently dangerous scene
  - Moved to access more critically injured patients
  - Goals
    - Move to safer, more spine-stable position
    - Maintain control of head, shoulders, hips

Skill 48-2: Rapid Extrication

- Standard precautions
- Manual in-line stabilization
- Assess distal pulses, movement, sensation in each extremity
- Apply rigid cervical collar
Skill 48-2: Rapid Extrication (Cont'd)

- Plan extrication
- Position stretcher with long board next to vehicle

Skill 48-2: Rapid Extrication (Cont'd)

- Rotate patient in short, controlled moves maintaining manual stabilization
- Back faces open door
- Support torso and legs

Skill 48-2: Rapid Extrication (Cont'd)

- Transfer manual stabilization of head and neck to rescuer in doorway
Skill 48-2: Rapid Extrication (Cont'd)
- Rescuer 1 positions foot at end of backboard onto vehicle seat
- Head at end on stretcher
- Rotate until patient is lowered onto backboard

Skill 48-2: Rapid Extrication (Cont'd)
- Rescuer 2 supports head and neck
- Lower onto backboard
- Control pelvis and legs, move upward into backboard

Skill 48-2: Rapid Extrication (Cont'd)
- Secure patient to board and board to stretcher
- Reassess distal pulses, movement and sensation in extremities
General Management of Spinal Injuries (Cont’d)
- Immobilization with long spine board
  - Blanket
  - 1–2 inches of padding beneath head
  - Pad small of back, under knees
  - X strapping method
  - Terrible triangle, place roll/towel
  - Standing takedown

Skill 48-3: Long Board Immobilization
- Standard precautions
- Place and maintain patient’s head in in-line position

Skill 48-3: Long Board Immobilization (Cont’d)
- Assess distal pulses, movement and sensation in each extremity
- Apply rigid cervical collar of appropriate size
Skill 48-3: Long Board Immobilization (Cont'd)

- Position long board, move patient onto it without compromising spine integrity
- Centered on board
- Apply padding to voids

Skill 48-3: Long Board Immobilization (Cont'd)

- Secure patient's torso to board

Skill 48-3: Long Board Immobilization (Cont'd)

- Secure head to board, fill voids
- Place head block device to prevent vertical movement
- Place two straps across forehead in X
Skill 48-3: Long Board Immobilization (Cont’d)

- Secure legs to board
- Secure arms

Reassess distal pulses, movement and sensation of extremities

Skill 48-4: Standing Takedown

- PPE
- Approach patient from front
- Manual in-line stabilization by placing hands on each side of head
Skill 48-4: Standing Takedown (Cont’d)

- Second rescuer assesses motor function and sensation in extremities
- Size for collar, assess neck and spine for injury
- Apply collar

Skill 48-4: Standing Takedown (Cont’d)

- Position long backboard behind patient between arms of first rescuer
- Another rescuer places arms under patient’s armpits and grasps backboard
- Place backboard against patient’s back

Skill 48-4: Standing Takedown (Cont’d)

- Rescuer in back gives order to lean toward him onto ground
- Reassess patient’s pulse, motor function, and sensation in all extremities
- Secure patient to long board
General Management of Spinal Injuries (Cont’d)

- Immobilization with long spine board
  - Immobilizing pediatric patients
    - Back of heads sticks out farther than shoulders
    - Padding between long spine board, upper back
    - Extra padding around terrible triangle
  - Immobilizing older adults
    - Orthopedic disorders alter shape, strength of spine, hips, shoulders
    - Extra padding
    - Less pain sensation, ischemia

- Immobilizing pregnant patients
  - Supine hypertensive syndrome
  - Impair adequate ventilation
  - Once on board, tip on left side to 15° angle

- Immobilizing obese patients
  - Supine, ventilation concern
  - Rolls, blankets under head for neutral alignment
  - Do not place on too small spine board
  - Use stretcher with limited movement
General Management of Spinal Injuries (Cont’d)

- Helmet removal
  - Removal provides ability to maintain neutral head position, airway access
  - Do not remove, impaled object, athlete with shoulder pads
  - Spine injured athletes wearing helmets
    - Face masks removed before transport, regardless of respiratory status

General Management of Spinal Injuries (Cont’d)

- Spinal immobilization in water
  - Must be trained
  - Swift water rescue specialist
  - Lifeguards
  - Wilderness water safety
  - Water rescue teams
  - Dry patient, keep warm
  - Hypothermia
  - Sink board beneath patient, float up
Assessment and Management of Nontraumatic Spinal Conditions

- Lower back pain
  - Thorough history
  - Onset time, gradual/sudden
  - Injury
  - What increases/decreases pain
  - Look for swelling, warmth, inflammation
  - No recent trauma, no immobilization needed
  - Pain relievers, muscle relaxers
  - Document vital signs, pain scale before/after medication

Assessment and Management of Nontraumatic Spinal Conditions (Cont'd)

- Degenerative disk disease
  - Natural aging, degeneration of intervertebral disks
  - Dysfunction
    - Outer disk layers tear slightly
    - Disk loses some watery padding
    - May separate from vertebrae
    - Muscle contraction
    - Tenderness
    - Localized inflammation
    - Pain extending through injured area

Assessment and Management of Nontraumatic Spinal Conditions (Cont'd)

- Degenerative disk disease
  - Instability
    - Disk space decreases from fluid loss, reabsorption begins
  - Restabilization
    - Disk hardens, stenosis
    - Scoliosis
Assessment and Management of Nontraumatic Spinal Conditions (Cont'd)

- **Spondylosis**
  - Bony overgrowths along anterior, lateral, foramen sides of vertebrae
  - Neurological dysfunction
  - Compress spinal nerves, cord
  - Cervical neck pain, peripheral sensory and motor dysfunction
  - Occipital head pain, radiating into shoulders
  - Lhermitte’s sign

Assessment and Management of Nontraumatic Spinal Conditions (Cont'd)

- **Herniated intervertebral disk**
  - Inner nuclear materials of intervertebral disk protrude out through fibrous outer disk layers
  - Pain exacerbated by movement, spine flexion/extension, sneezing/coughing, leg movement
  - Supportive
  - Pain management
  - Transport, position of comfort

Assessment and Management of Nontraumatic Spinal Conditions (Cont'd)

- **Spinal tumors**
  - Abnormal, rapid growth in spinal foramen
  - Permanent damage
  - 85% originate from metastatic cancers
Medications Used in Spinal Cord Injury Management

- Steroids for spinal cord injury
- Medications for neurogenic, spinal shock
- Controlling combative patient

Documenting Assessment and Care of Spine-Injured Patient

- Be consistent, thorough
- Record initial findings, vital signs, routine physical examination, vital signs every 5–15 minutes
- Identify mechanism of injury, how patient was found, history of moving
- Suspicion of spinal cord/column injury

Documenting Assessment and Care of Spine-Injured Patient (Cont'd)

- Specific spine examination
- Suspicions
- Tools used in immobilization
- Atypical, state reasons
- Refusal of care, patient sign forms
Documenting Assessment and Care of Spine-Injured Patient (Cont’d)

- If patient refuses spine assessment, document thoroughly, have patient sign refusal forms

Chapter Summary

- Spinal column composed of 33 vertebrae: 7 cervical, 12 thoracic, 5 lumbar, 5 sacral, 4 coccygeal
- Spinal cord runs through the spinal foramen, beginning at base of the skull and terminating between vertebrae L2 and L3 in adults at the conus medullaris

Chapter Summary (Cont’d)

- Many mechanisms can potentially injure the spinal column and cord; an EMS professional is responsible for determining when the mechanism is significant enough to cause injury and when it is not
- Mechanism of injury for spine injury must have thorough spine assessment
  - If assessment cannot be performed, fully immobilize the patient
Chapter Summary (Cont’d)

- Complete spine assessment includes determining patient reliability; evaluating history for spine pain, numbness, tingling, electrical shooting sensations; performing a specific examination and evaluating for spine tenderness and specific motor and sensory skills

Chapter Summary (Cont’d)

- If the patient fails spine assessment, immobilize the patient and document the findings; spine pain and tenderness indicate column injury, whereas numbness, tingling, electrical shooting sensations, and impaired motor/sensory skills all indicate cord injury
- PMS (pulses, movement, and sensation) best evaluates musculoskeletal injuries, not spinal injuries

Chapter Summary (Cont’d)

- When immobilizing a pediatric patient, place a pad beneath the shoulders, not the head
- Do not hesitate to place the patient in a lateral recumbent position while on the long board; can safely immobilize the patient in that position, but it takes additional padding
- Provide ample padding to eliminate all terrible triangles
Chapter Summary (Cont’d)

- Secure the patient to the long board with Xs across the shoulders, chest, hips, and head and straps across the legs
- Not all spine injuries are trauma related
  - If no trauma has occurred, immobilization is not indicated; look for and identify another cause

Questions?