* Overview of Anatomy and Physiology
* Functions of the skeletal system
* Support
* Protection
* Movement
* Mineral storage
* Hemopoiesis
* Structure of bones
* Four classifications based on form and shape
* Long, short, flat, and irregular
* Figure 44-2
* Figure 44-3
* Overview of Anatomy and Physiology
* Articulations (joints)
* Allow movement
* Three types according to degree of movement
* Synarthrosis—no movement
* Amphiarthrosis—slight movement
* Diarthrosis—free movement
* Divisions of the skeleton
* Axial skeleton
* Appendicular skeleton
* Figure 44-1
* Overview of Anatomy and Physiology
* Functions of the muscular system
* Motion
* Maintenance of posture
* Production of heat
* Skeletal muscle structure
* Epimysium
* Perimysium
* Endomysium
* Figure 44-5
* Figure 44-6
* Overview of Anatomy and Physiology
* Nerve and blood supply
* Blood vessels provide a constant supply of oxygen and nutrition, and nerve cells/fibers supply a constant source of information
* Muscle contraction
* Muscle stimulus—when a muscle cell is adequately stimulated, it will contract
* Muscle tone—skeletal muscles are in a constant state of readiness for action
* Types of body movements—flexion, extension, abduction, adduction, rotation, supination, pronation, dorsiflexion, and plantar flexion
* Laboratory and Diagnostic Examinations
* Radiographic studies
* Myelogram
* Nuclear scanning
* Magnetic resonance imaging (MRI)
* Computed axial tomography (CT or CAT scan)
* Bone scan
* Endoscopic examination
* Arthroscopy
* Endoscopic spinal microsurgery
* Laboratory and Diagnostic Examinations
* Aspiration
* Synovial fluid aspiration
* Electrographic procedure
* Electromyogram (EMG)
* Laboratory tests
* Calcium
* Erythrocyte sedimentation rate (ESR)
* Lupus erythematosus (LE) preparation
* Rheumatoid factor (RF)
* Uric acid (blood)
* Inflammatory Disorders of the
Musculoskeletal System
* Rheumatoid arthritis
* Etiology/pathophysiology
* Most serious form of arthritis
* Chronic, systemic disease
* Most common in women of childbearing age
* Autoimmune disorder, but may also be genetic
* May affect lungs, heart, blood vessels, muscles, eyes, and skin
* Chronic inflammation of the synovial membrane of the diarthrodial joints (movable)
* Inflammatory Disorders of the
Musculoskeletal System
* Rheumatoid arthritis *(continued)*
* Clinical manifestations/assessment
* Characterized by periods of remission and exacerbation
* Malaise
* Muscle weakness
* Loss of appetite
* Generalized aching
* Edema and tenderness of joints
* Limited range of motion (morning stiffness)
* Figure 44-7
* Inflammatory Disorders of the
Musculoskeletal System
* Rheumatoid arthritis *(continued)*
* Diagnostic tests
* Radiography studies show loss of articular cartilage and change in bone structure
* Laboratory tests
* Erythrocyte sedimentation rate (ESR)
* Rheumatoid factor (RF)
* Latex agglutination test
* Synovial fluid aspiration
* Inflammatory Disorders of the
Musculoskeletal System
* Rheumatoid arthritis *(continued)*
* Medical management/nursing interventions
* Pharmacological management
* Salicylates, NSAIDs, COX-2 inhibitors, anti-inflammatory agents, disease-modifying antirheumatoid drugs
* Rest: 8 to 10 hours of sleep a night
* Exercise: Range of motion two to three times per day
* Heat: Hot packs, heat lamp, and/or hot paraffin
* Rehabilitation
* Inflammatory Disorders of the
Musculoskeletal System
* Ankylosing spondylitis
* Etiology/pathophysiology
* Chronic, progressive disorder of the sacroiliac and hip joints, the synovial joints of the spine, and the adjacent soft tissues
* Most common in young men
* Strong hereditary tendency
* Clinical manifestations/assessment
* Pain and stiffness in back; decreased ROM
* Elevated temperature; tachycardia; hyperpnea
* Inflammatory Disorders of the
Musculoskeletal System
* Ankylosing spondylitis *(continued)*
* Diagnostic tests
* Hemoglobin, hematocrit, ESR, alkaline phosphatase
* Radiographic
* Medical management/nursing interventions
* Pharmacological management
* Analgesics, NSAIDs
* Exercise program: swimming and walking
* Surgery: replace fused joints
* Maintain spine alignment
* Turn, position, and breathing exercises every 2 hours
* Inflammatory Disorders of the
Musculoskeletal System
* Osteoarthritis (degenerative joint disease)
* Etiology/pathophysiology
* Nonsystemic, noninflammatory disorder that progressively causes bones and joints to degenerate
* Primary
* Cause is unknown
* Secondary
* Caused by trauma, infections, previous fractures, rheumatoid arthritis, stress on weight-bearing joints
* Figure 44-9
* Inflammatory Disorders of the
Musculoskeletal System
* Osteoarthritis (degenerative joint disease) *(continued)*
* Clinical manifestations/assessment
* Joint edema, tenderness, instability, and deformity
* Heberden’s nodes
* Bouchard’s nodes
* Diagnostic tests
* Radiographic studies
* Arthroscopy
* Synovial fluid examination
* Bone scans
* Inflammatory Disorders of the
Musculoskeletal System
* Osteoarthritis (degenerative joint disease) *(continued)*
* Medical management/nursing interventions
* Pharmacological management
* Salicylates, NSAIDs, corticosteroids, glucosamine supplements
* Exercise balanced with rest
* Heat applications
* Gait enhancers (canes, walkers, etc.)
* Surgery
* Osteotomy
* Joint replacement
* Inflammatory Disorders of the
Musculoskeletal System
* Gout (gouty arthritis)
* Etiology/pathophysiology
* Metabolic disease resulting from an accumulation of uric acid in the blood
* Caused by an ineffective metabolism of purines
* Primary: hereditary factors
* Secondary: use of certain drugs, complication of other diseases, or idiopathic
* Affects men more frequently than women
* Does not occur before puberty in males or before menopause in females
* Inflammatory Disorders of the
Musculoskeletal System
* Gout (gouty arthritis) *(continued)*
* Clinical manifestations/assessment
* Excruciating pain
* Edema
* Inflammation (most common in the great toe)
* Tophi
* Diagnostic tests
* Serum and uric acid level, CBC, ESR
* Radiography studies
* Synovial fluid aspiration
* Inflammatory Disorders of the
Musculoskeletal System
* Gout (gouty arthritis) *(continued)*
* Medical management/nursing interventions
* Pharmacological management
* Colchicine, phenylbutazone (Butazolidin), indomethacin (Indocin), corticosteroids, allopurinol (Zyloprim), sulfinpyrazone (Anturane)
* Encourage fluid intake
* Monitor intake and output
* Bed rest and joint immobilization
* Dietary restrictions
* Other Disorders of the
Musculoskeletal System
* Osteoporosis
* Etiology/pathophysiology
* Reduction of bone mass
* Most common in women ages 55 to 65
* Contributing factors: immobilization; steroids; high intake of caffeine; diet low in calcium, high in protein; smoking; sedentary lifestyle
* Clinical manifestations/assessment
* Backache
* Porous and brittle bones
* Dowager’s hump
* Other Disorders of the
Musculoskeletal System
* Osteoporosis *(continued)*
* Diagnostic tests
* CBC, serum calcium, phosphorus, alkaline phosphatase, blood urea nitrogen, creatinine level, urinalysis, liver and thyroid function tests
* Radiography studies
* Medical management/nursing interventions
* Pharmacological management
* Calcium supplements, vitamin D
* Estrogen, alendronate (Fosamax)
* Weight-bearing exercises
* Dietary recommendations
* Other Disorders of the
Musculoskeletal System
* Osteomyelitis
* Etiology/pathophysiology
* Local or generalized infection of the bone and bone marrow
* Staphylococci are the most common cause
* Introduced through trauma (injury or surgery) or via the bloodstream from another site in the body to the bone
* Bacteria invade the bone and degeneration of bone occurs
* Other Disorders of the
Musculoskeletal System
* Osteomyelitis *(continued)*
* Clinical manifestations/assessment
* Persistent, severe, and increasing bone pain
* Wound draining purulent fluid
* Signs and symptoms of infection: temperature, tachycardia, and tachypnea
* Edema of affected area
* Diagnostic tests
* Radiography studies; bone scan
* CBC; ESR; cultures of blood and drainage
* Other Disorders of the
Musculoskeletal System
* Osteomyelitis *(continued)*
* Medical management/nursing interventions
* Pharmacological management
* Antibiotic therapy
* Surgery: removal of necrotic bone
* Absolute rest of affected extremity
* Wound care
* Irrigate with hydrogen peroxide or antibiotic solution; cover with sterile dressing
* Drainage and secretion precautions
* Dietary recommendations: high in calories, protein, and vitamins
* Other Disorders of the
Musculoskeletal System
* Fibromyalgia syndrome (FMS)
* Etiology/pathophysiology
* Musculoskeletal chronic pain syndrome
* Unknown etiology
* Clinical manifestations/assessment
* Generalized aching
* Irritable bowel syndrome
* Tension headache
* Paresthesia of upper extremities
* Sensation of edematous hands
* Other Disorders of the
Musculoskeletal System
* Fibromyalgia syndrome (FMS) *(continued)*
* Diagnostic tests
* No specific laboratory or radiographic tests diagnose FMS
* Medical management/nursing interventions
* Pharmacological management
* Tricyclic antidepressants
* Patient education and reassurance
* Exercise
* Relaxation techniques
* Surgical Interventions for Total Knee or Total Hip Replacement
* Knee arthroplasty (total knee replacement)
* Replacement of the knee joint
* Restore motion of the joint, relieve pain, or correct deformity
* Hip arthroplasty (total hip replacement)
* Replacement of the hip joint
* Figure 44-11
* Figure 44-14
* Surgical Interventions for Total Knee or Total Hip Replacement
* Arthroplasty
* Nursing interventions
* Intake and output
* Drainage from operative drains
* Oral and intravenous intake
* Urinary output
* Promote respiratory function
* Give oxygen 2 to 3 L/min
* Incentive spirometer; cough and deep-breathe
* Bed rest for 24 to 48 hours
* Change dressing as ordered
* Diet as ordered
* Neurovascular checks and vital signs every 4 hours
* Surgical Interventions for Total Knee or Total Hip Replacement
* Arthroplasty *(continued)*
* Nursing interventions *(continued)*
* Physical therapy will initiate ambulation and prescribe routine
* Antiembolisim stockings
* Avoid dislocation of prosthesis
* Avoid adduction and hyperflexion of hip
* Use toilet riser to prevent hyperflexion of hip
* Fractures
* Fracture of the hip
* Etiology/pathophysiology
* Most common type of fracture
* Women at higher risk due to osteoporosis
* Types: intracapsular and extracapsular
* Clinical manifestations/assessment
* Severe pain at site
* Inability to move the leg voluntarily
* Shortening or external rotation of the leg
* Figure 44-16
* Fractures
* Fracture of the hip *(continued)*
* Diagnostic tests
* Radiographic examination
* Hemoglobin
* Medical management/nursing interventions
* Buck’s or Russell’s traction until surgery
* Surgical repair
* Internal fixation
* Neufeld nail and screws, Kuntscher nail
* Prosthetic implants
* Austin Moore prosthesis, bipolar hip replacement
* Fractures
* Fracture of the hip *(continued)*
* Medical management/nursing interventions *(continued)*
* Postoperative interventions
* Wound and drain assessment
* Vital signs
* Incentive spirometer and turning every 2 hours
* Antiembolic stockings; anticoagulation therapy
* Maintain leg abduction
* Limit weight-bearing on affected side
* Chairs and commode seats should be raised to prevent flexion of hip beyond 60 degrees
* Fractures
* Fracture of the hip *(continued)*
* Medical management/nursing interventions *(continued)*
* Patient teaching for open reduction internal fixation (ORIF)
* Assess ability to understand
* Assist to dangle at bedside
* No weight on operative side
* Turn every 2 hours, maintain abduction
* Physical therapy will instruct as to ambulation and weight-bearing
* As patient progresses, encourage continuing ambulation only with assistance
* Fractures
* Fracture of the hip *(continued)*
* Medical management/nursing interventions *(continued)*
* Patient teaching for hip prosthetic implant
* Avoid hip flexion beyond 60 degrees for approximately
10 days; beyond 90 degrees for 2 to 3 months
* Avoid adduction of the affected leg beyond midline for
2 to 3 months (maintain abduction)
* Maintain partial weight-bearing for approximately 2 to
3 months
* Avoid positioning on the operative side
* Fractures
* Other fractures
* Etiology/pathophysiology
* A traumatic injury to a bone in which the continuity of the tissue of the bone is broken
* Pathological or spontaneous fractures
* Types of fractures: open, closed, greenstick, complete, comminuted, impacted, transverse, oblique, spiral, Colle’s, and Pott’s
* Fractures
* Other fractures *(continued)*
* Clinical manifestations/assessment
* Pain
* Loss of normal function
* Obvious deformity
* Change in the curvature or length of bone
* Crepitus (grating sound with movement)
* Soft tissue edema
* Warmth over injured area
* Ecchymosis of skin surrounding injured area
* Loss of sensation distal to injury
* Fractures
* Other fractures *(continued)*
* Diagnostic tests
* Radiographic examination
* Medical management/nursing interventions
* Splinting to prevent edema
* Body alignment
* Elevation of body part
* Application of cold packs, first 24 hours
* Administration of analgesics
* Assess for change in color, sensation, or temperature
* Observe for signs of shock
* Fractures
* Other fractures *(continued)*
* Medical management/nursing interventions *(continued)*
* Closed (simple)
* Closed reduction; immobilization; traction
* Open reduction with internal fixation device
* Open (compound)
* Surgical debridement and culture of wound
* Administration of tetanus toxoid
* Observation for signs of infection
* Closure of wound
* Reduction and immobilization of fracture
* Fractures
* Fracture of the vertebrae
* Etiology/pathophysiology
* Diving accidents
* Blows to the head or body
* Osteoporosis
* Metastatic cancer
* Motorcycle and car accidents
* Displaced fracture may place pressure on or sever the spinal cord nerves
* Fractures
* Fracture of the vertebrae *(continued)*
* Clinical manifestations/assessment
* Pain at site of injury
* Partial or complete loss of mobility or sensation
* Evidence of fracture/fracture dislocation on x-ray
* Medical management/nursing interventions
* Stable injuries
* Pain medication, muscle relaxants
* Back support, brace, or cast
* Unstable fractures
* Traction, open reduction
* Fractures
* Fracture of the pelvis
* Etiology/pathophysiology
* Falls, automobile accidents, crushing accidents
* Clinical manifestations/assessment
* Unable to bear weight without discomfort
* Pelvic tenderness and edema
* Signs of shock
* Medical management/nursing interventions
* Bed rest—More severe fractures may require surgery and/or spica or body cast
* Complications of Fractures
* Compartment syndrome
* Cause
* Progressive development of arterial vessel compression and reduced blood supply to an extremity
* Clinical manifestations/assessment
* Sharp pain with movement, numbness or tingling in the affected extremity, cool and pale or cyanotic, slow capillary refill
* Medical management/nursing interventions
* Fasciotomy (incision into the fascia)
* Figure 44-26
* Complications of Fractures
* Shock
* Cause
* Blood loss, pain, fear
* Clinical manifestations/assessment
* Altered level of consciousness, restlessness
* Hypotension, tachycardia, and tachypnea
* Pale, cool, moist skin
* Medical management/nursing interventions
* Restore blood volume; shock trousers
* Oxygen
* Complications of Fractures
* Fat embolism
* Cause
* Embolization of fat tissue with platelets
* Clinical manifestations/assessment
* Irritability, restlessness,disorientation, stupor, coma, chest pain, and dyspnea
* Medical management/nursing interventions
* IV fluids
* Steroids, digoxin
* Oxygen
* Complications of Fractures
* Gas gangrene
* Cause
* Infection of skeletal muscle by *Clostridium*
* Clinical manifestations/assessment
* Pain at site of injury
* Signs of infection; gas bubbles under the skin
* Necrotic skin at site; foul odor from wound
* Medical management/nursing interventions
* Excision of gangrenous tissue
* Antibiotics; strict aseptic technique
* Complications of Fractures
* Thromboembolus
* Cause
* Blood vessel is occluded by an embolus
* Clinical manifestations/assessment
* Area tingles and is cold, numb, and cyanotic
* Pulmonary embolus causes a sharp thoracic pain
* Medical management/nursing interventions
* Anticoagulants
* Complications of Fractures
* Delayed fracture healing
* Healing is delayed but will eventually occur
* Nonunion
* The ends of the fracture fail to stabilize and heal after 6 to 9 months
* Skeletal Fixation Devices
* External fixation devices
* Skeletal pin external fixation
* Immobilizes fractures by the use of pins inserted through the bone and attached to a rigid external metal frame
* Casts/cast brace
* Made of layers of plaster of Paris, fiberglass, or plastic roller bandages
* Stockinette applied, then a sheet of wadding, and casting material
* Nonsurgical Interventions for Musculoskeletal Disorders
* Traction
* The process of putting an extremity, bone, or group of muscles under tension by means of weights and pulleys to:
* Align and stabilize a fracture site
* Relieve pressure on nerves
* Maintain correct positioning
* Prevent deformities
* Relieve muscle spasms
* Skeletal or skin
* Traumatic Injuries
* Contusion: A blow or blunt force that causes local bleeding under the skin
* Sprains: Wrenching or hyperextension of a joint
* Whiplash: Injury at cervical spine caused by hyperextension
* Strains: Microscopic muscle tears as a result of overstretching muscles and tendons
* Traumatic Injuries
* Contusions, sprains, whiplash, strains
* Medical management/nursing interventions
* Elevate injured area
* Cold compresses for 15 to 20 minutes intermittently for 12 to 36 hours
* Warm compresses for 15 to 30 minutes four times a day after 24 hours
* Compressive dressings and/or splint
* Surgery
* Traumatic Injuries
* Dislocations
* Etiology/pathophysiology
* Temporary displacement of bones from their normal position
* Clinical manifestations/assessment
* Erythema; discoloration
* Edema
* Pain
* Limitation of movement
* Deformity or shortening of the extremity
* Traumatic Injuries
* Dislocations *(continued)*
* Medical management/nursing interventions
* Closed reduction
* Open reduction
* Cold compresses first 24 hours and warm compresses after 24 hours
* Elevate injured extremity
* Elastic bandage
* Immobilize
* Analgesics
* Traumatic Injuries
* Carpal tunnel syndrome
* Etiology/pathophysiology
* Compression of the median nerve between the carpal ligament and other structures
* Predisposing factors
* Obese, middle-aged women
* Employment in occupations involving repetitious motions of the fingers and hands
* Figure 44-38
* Traumatic Injuries
* Carpal tunnel syndrome *(continued)*
* Clinical manifestations/assessment
* Paresthesia
* Hypoesthesia
* Burning pain or tingling in the hands
* Inability to grasp or hold small objects
* Edema of the hand, wrist, or fingers
* Muscle atrophy
* Depressed appearance at the base of the thumb on the palmar side
* Traumatic Injuries
* Carpal tunnel syndrome *(continued)*
* Diagnostic tests
* Physical exam—Tinel’s sign
* Electromyogram
* MRI
* Medical management/nursing interventions
* Immobilizer
* Elevate extremity
* ROM exercises
* Hydrocortisone injections
* Surgery
* Traumatic Injuries
* Herniation of intervertebral disk
* Etiology/pathophysiology
* Rupture of the fibrocartilage surrounding an intervertebral disk, releasing the nucleus pulposus that cushions the vertebrae above and below
* Lumbar and cervical herniations are most common
* May occur from lifting, twisting, trauma, or degenerative changes
* Figure 44-39
* Traumatic Injuries
* Herniation of intervertebral disk *(continued)*
* Clinical manifestations/assessment
* Lumbar
* Low back pain that radiates over the buttock and numbness and tingling in affected leg
* Cervical
* Neck pain, headache, and neck rigidity
* Diagnostic tests
* CAT scan, myelography, and electromyelography
* Traumatic Injuries
* Herniation of intervertebral disk *(continued)*
* Medical management/nursing interventions
* Pharmacological management
* Analgesics
* Muscle relaxants
* Bed rest
* Physical therapy
* Traction
* Surgery
* Laminectomy, spinal fusion, diskectomy, chemonucleolysis
* Tumors
* Tumors of the bone
* Etiology/pathophysiology
* May be primary or secondary
* Benign or malignant
* Osteogenic sarcoma
* Osteochondroma
* Clinical manifestations/assessment
* Spontaneous fractures
* Anemia
* Pain especially with weight-bearing
* Edema and discoloration of skin at site
* Tumors
* Tumors of the bone *(continued)*
* Diagnostic tests
* Radiography studies
* Bone scan; bone biopsy
* CBC; platelet count; serum protein levels
* Serum alkaline phosphatase level
* Medical management/nursing interventions
* Surgery
* Chemotherapy and radiation
* Amputation
* Amputation of a portion of or an entire extremity
* Malignant tumors, injuries, impaired circulation, congenital deformities, infections
* Postoperative nursing interventions
* Raise foot of bed to elevate extremity
* Encourage movement
* Place in prone position at least two times a day
* Teach strengthening exercises
* Elastic wraps to shape residual extremity
* Assess for respiratory complications
* Phantom-limb pain is normal
* Figure 44-40
* Nursing Process
* Assessment
* Scoliosis
* Lateral curvature of the spine
* Kyphosis
* A rounding of the thoracic spine
* Hump-backed appearance
* Lordosis
* An increase in the curve at the lumbar region
* Blanching test
* Capillary nail refill
* Nursing Process
* Nursing diagnoses
* Mobility, impaired physical
* Mobility, impaired bed
* Coping, ineffective
* Anxiety
* Pain
* Knowledge, deficient