Musculoskeletal System

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Musculoskeletal Assessment: Health History

- OLD CART
- O: Onset of complaint
- L: Location of symptoms
- D: Duration of symptoms
- C: Characteristics of the symptoms
- A: Aggravating factors
- R: Relieving factors
- T: Treatment tried and timing of symptoms
Components of Health History

• Typical musculoskeletal complaints include pain, loss of function, joint instability or stiffness, loss of sensation, or a newly discovered deformity

• An acute condition alerts the provider to a different set of differential diagnoses than a chronic condition

• Acute conditions involving trauma are suggestive of a fracture, dislocation, or rupture of tissue

• Mechanism of injury (twisting, blunt force, height of fall)

• Time of when pain occurs

• Location or distribution of pain
Physical Exam Techniques: Inspection

- Initial observation/impression
- Any sign of potential loss of life or limb is an emergency requiring immediate attention
- Attitude (position/posture of body part/extremity)
- Alignment (mal-alignment suggest soft tissue injury, fx, or dislocation)
- Deformity
- Color (redness, ecchymosis, pallor, cyanosis)
- Swelling (diffuse or localized)
Physical Exam: Palpation

- Pain
- Tenderness
- Localized temperature changes
- Capillary refill
- Pulses
- Size of lymph nodes
- Muscle shape
- Tone
- Resistance
Physical Exam: Motion

- Joint ROM
- Affected side is compared to the contralateral
- Active and passive ROM
- Note degree of ROM and pain
- Injuries to muscles (strains) or ligaments (sprains) may result in deformity, weakness, or loss of strength, which can impact ROM
Categories of Sprains and Strains

Degree of Strain (Muscle)

• 1st Mild
  • Few muscle fibers torn

• 2nd Moderate
  • Almost half of muscle torn

• 3rd Severe
  • All ligament fibers torn/ruptured

Degree of Sprain (Ligament)

• 1st Mild
  • Few ligament fibers torn

• 2nd Moderate
  • Half of ligament torn

• 3rd Severe
  • All ligament fibers torn or ruptured
Strength Testing

- 5 - Normal strength
- 4 - Movement against gravity with some resistance
- 3 - No resistance, some movement against gravity is possible
- 2 - Very weak motion, movement dependent on position or gravity assisted
- 1 - Muscles contract but are ineffective with no movement
- 0 - No muscle contraction, no movement
Neurological Assessment

• Localization of a peripheral or central nervous system lesion

• Exam includes: sensory, motor, reflex, and cerebella testing

• Presence of pain and a decrease in or loss of extremity sensation, strength, or reflexes indicates nerve root pathology
Neurological Assessment

• Level of consciousness
• GCS
• Orientation and speech fluency
• Cranial nerves
• Strength
• Drift
• Sensation
• Ataxia
• Cerebellar signs
Neurological Assessment

• LOC
  – Earliest indication of mental status changes
  – Mood, behavior, alertness, awareness
  – Orientation to person, place, time

Stimulation to the Patient in Coma

Cranial Nerve Assessment

• 12 nerves in pairs (right and left)
• Nerves 3-12 originate in the brainstem
• Nerve function is a reliable indicator of brainstem function

Memory Jogger:

• “On Old Olympus Tiny Tops A Fin and German Viewed Some Hops”
Cranial Nerves I, II

• I Olfactory
  – Smell
  – Not often assessed

• II Optic
  – Vision acuity
  – Visual fields
Cranial Nerves III, IV, VI

- Pupils
  - Reaction
  - Size
  - Shape
  - Equality

- EOMs
Cranial Nerves V and VII

- Cotton ball test
- Smile and show me your teeth
Cranial Nerve VIII

• Whisper test
  – Rare in the inpatient setting

• Balance
  – Vertigo
  – Nystagmus with EOMs
Cranial Nerve IX, X, XI, XII

• Gag and Swallow
  – Can assess with mouth care and suctioning

• Shoulder shrug

• Tongue movement
  – Side to side
Movement and Coordination

• Ataxia – lack of voluntary coordination
  – Present if unable to complete these tasks
    – Finger to Nose
    – Heel Down Shin
    – Rapid Alternating Movements
    – Gait Disturbance
    – Abnormal Movements
Sensory Testing

Sensory Description

• Sensitive to light touch
• Able to localize pain with protective sensation
• Responds to deep pain only, no response to light touch or pin prick
• Absent response to all stimuli

Significance of Finding

• Appropriate screening exam
• Intact proprioception
• Indicates a severe injury or comatose state
• Associated with loss of nerve function and complete nerve transection
# Reflex Testing

<table>
<thead>
<tr>
<th>Grade</th>
<th>Response</th>
</tr>
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<tbody>
<tr>
<td>0+</td>
<td>Absent</td>
</tr>
<tr>
<td>1+</td>
<td>Hypoactive</td>
</tr>
<tr>
<td>2+</td>
<td>Normal</td>
</tr>
<tr>
<td>3+</td>
<td>Brisk</td>
</tr>
<tr>
<td>4+</td>
<td>Hyperactive with clonus</td>
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Physical Assessment: Cervical Spine (Neck)

• Note any recent trauma or injury involving the head
• Numbness, tingling, paralysis, and neck or arm positions that aggravate or induce the symptom
• Radicular symptoms which spread down the arm
• Neck pain w/o hx of trauma (degenerative OA, or RA)
• Pain in C-spine region may originate from adjacent structures (teeth, jaw, cardiovascular system, shoulders)
Lumbar Spine (Back)

• Back pain typically fits into one of four categories: disk, facet, nerve root involvement, or neurogenic intermittent claudication

• Index of suspicion based on patient’s age, occupation, description of symptoms, and pattern of symptom presentation

• Serious spine pathology should be considered if any of the following red flags are noted: symptoms in patient younger than 20 or older than 55, history of violent trauma, carcinoma, drug abuse, chronic systemic steroid use, HIV, unintended significant weight loss, & neurologic compromise
Special Spine Tests

• Oppenheim test
• Babinski reflex
• Beevor’s sign
• FABERE (Patrick’s) test
• Femoral nerve stretch
• Hoover test
• Valsalva maneuver
• Scoliosis test
• Straight leg test
• Brudzinski’s sign
The most common outpatient hip problems are related to bursitis, arthritis, avascular necroses of the hip, fractures, metastatic disease, vascular occlusions, and or referred pain from the low back.

Trauma related hip pain in the elderly is highly suggestive of a hip fracture.

Younger patients with trauma-induced pain in the absence of fracture are suspect for hip labral tears.

Structures adjacent to the hip (lumbar spine, knee, lower GI tract and reproductive tract) should be evaluated for referred pain.
Knee

• Presence of knee pain associated with trauma

• Did the injury occur while suddenly accelerating or decelerating after moving at constant speed?

• Was an audible pop heard?

• Did it occur while bearing weight and rotating the leg?

• Swelling in the knee immediately following an injury signifies trauma within the joint

• Any functional limitation (kneeling, cutting, pivoting, twisting, climbing)
Knee

• Is the pain worse after sitting for long periods of time?
• Has the knee been previously injured?
• Do medications relieve symptoms?
• Is there pain at rest or during the night?
Diagnostic Studies in Orthopaedics: Serum

- Acid Phosphatase (ACP)
- Aldolase (ALD)
- Alkaline Phosphatase (ALPA)
- Anti-Nuclear Antibody (ANA)
- Anti-Steptolysin O (ASO)
- Calcium
- Creatine Kinase (CK)
- Creatinine
- C-Reactive Protein (CRP)
- D-Dimer test
- Enzyme-Linked Immunosorbent Assay Test (ELISA)
- Erythrocytes/Red Blood Cells
- Erythrocyte Sedimentation Rate (ESR)
- Erythropoietin
- Hematocrit
Diagnostic Studies in Orthopaedics: Serum

- Hemoglobin
- Lyme Antibody
- Iron
- Leukocytes/WBCs
- Lupus Erythematosus Cell
- Phosphorus
- Rheumatoid Factor (RF)
- Serum Osteocalcin
- Total Iron Binding Capacity
Diagnostic Orthopaedic Tests: Urine

• Bence Jones Protein
• Urinalysis
• Urine Calcium
• Urine Creatinine Clearance
• Urine Collagen-Linked N-Telopeptide
Diagnostic Orthopaedic: Radiographic Tests

- Angiography
- Arthrography
- Bone Scan
- Computed Tomography (CT)
- Positive Emission Tomography
- Duplex Ultrasound Imaging
- Indium WBC Scan
- Magnetic Resonance Imaging
- Musculoskeletal Ultrasound
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Orthopaedic Infections: Osteomyelitis

- Inflammatory disorder of bone caused by infection
- Can lead to necrosis and destruction of bone
- Infection may be acute or chronic
- Acute osteomyelitis infection occurs prior to necrosis or bone destruction
- Chronic osteomyelitis symptoms present for >3 months
Osteomyelitis

• Spread from soft tissues and joints via decubitis or diabetic ulcers
• Hematogenous seeding (vertebral or long bone metaphyses)
• Direct inoculation of a microorganism into the bone
• Prosthetic joint infections
Pathophysiology

• Organism causes acute inflammation of the bone

• Inflammatory factors and leukocytes contribute to necrosis and destruction of the bone

• Vascular channels are compressed leading to ischemia and later bone necrosis

• Biofilm may lead to prosthetic orthopaedic infections

• Bacteria living in a biofilm can have a significantly different properties than free floating bacteria
Osteomyelitis Risk Factors

• Young age
• Predispose to bacteremia (indwelling intravascular catheters, distant foci of infection, IV drug abuse)
• Distant site infections often associated with acute osteomyelitis (skin, urinary tract, respiratory tract)
• Sickle cell anemia
• Chronic granulomatous dx
• Penetrating bites or puncture wounds
• Open bone fractures
• Pressure ulcers
Osteomyelitis Complications

• Morbidity
• Mortality
• Bone loss
• Localized Osteoporosis
• Osteolysis
• Pathologic Fx
• Sepsis
Hematogenous Long Bone Osteomyelitis

- Abrupt onset of high fever (only in 50% of neonates with osteomyelitis)
- Fatigue
- Irritability
- Malaise
- Restriction of movement
- Local edema, erythema, and tenderness
Hematogenous Vertebral Osteomyelitis

- Insidious onset
- History of an acute bacteremia episode
- May be associated with contiguous vascular insufficiency
- Local edema, erythema, and tenderness
- Failure of a young child to sit up normally
Chronic Osteomyelitis

- Non-healing ulcer
- Sinus tract drainage
Osteomyelitis: Exam & Diagnostic Tests

- Signs or symptoms of soft tissue and bone tenderness
- Swelling and redness
- Prosthetic joint suspected (joint aspiration)
- X-ray (does not show changes to bone in early phase; it can take 10-14 days after the start of an infection to show bone lysis)
- CT & MRI are considered standard for dx
- WBC, erythrocyte sedimentation rate, c-reactive protein (may be elevated in a patient with osteomyelitis)
- Needle bone aspiration
Therapeutic Modalities

• Non-surgical treatment for osteomyelitis starts with improving any host deficiencies (anemia, hypoxia, hyperglycemia, metabolic issues)

• Antibiotic tx

• More complex cases may require extensive surgical debridement
Nursing Interventions & Patient Education

- Acute care setting (pain assessment)
- Activity intolerance (pressure ulcers)
- Office setting (reinforcement of discharge instructions)
- Long-term antibiotic therapy (reminders re: importance of taking antibiotics as prescribed)
- Education re: signs and symptoms to report (fever, chills, increased drainage, changes in tissues surrounding the area, etc.)
- Teach appropriate use of mobility aids and weight bearing limitations
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Septic Arthritis

- Infection of synovium and joint space
- Knee (50% of cases)
- Hip (20% of cases)
- Inflammatory response
- Gonococcal vs Non-Gonococcal
- Patients at risk for septic arthritis have abnormal joints because of arthritis (RA, osteoarthritis, injury induced arthritis)
Septic Arthritis

• Bacteria or microorganisms spread through the bloodstream to a joint

• In immunocompromised patients, bacteria that usually are not pathogenic can cause infection

• Staphylococcus aureus is the most common organism

• Symptoms usually develop quickly (fever, joint swelling, joint pain)

• As the infection progresses, cartilage is destroyed
Septic Arthritis Complications

- Failure to resolve infection
- Progression of articular cartilage damage
- Severe degenerative changes
- Children can develop limb deformities
- Patients with septic arthritis of the hip may later develop avascular necrosis of the femoral head
- Renal, cardiac, or respiratory failure in the elderly
Nursing Considerations

• Assessment of worsening infection (vital signs, changes in mental status, pain)

• In office setting (observe for any signs or symptoms of extended infection and assess the patient’s response to antibiotic therapy)

• Allow patients to verbalize fears and apprehension to assist with adherence to the treatment plan
Prosthetic Joint Infections

• Infection surrounding a prosthetic joint
• Classified into early, delayed, and late onset
• Hematogenous spread (IV catheters, pneumonia, UTI, dental caries, gum disease, and skin conditions)
• Leads to seeding of the prosthetic joint
• In cases of TKR, progressive infections may lead to amputation
Classification Based on Onset of Infection

- Early onset
- Usually acquired during implantation
- Often due to virulent organisms (staph aureus or gram negative bacteria)
- Present with acute onset pain, fever, drainage
Classification Based on Onset of Infection

- Delayed onset
- >30 days post-operatively
- Up to 1 year is considered healthcare associated
- Less virulent organism
- Present with progressive pain
Classification Based on Onset of Infection

- Late onset
- >1 year after surgery
- Develop in the setting of infection at another site
- Associated with Streptococci, Staph, and gram neg bacteria
- Presentation similar to acute onset in previously well-functioning joint
Skin & Soft Tissue Infections

- Common and usually uncomplicated
- Can worsen if not recognized and treated properly
- Impetigo
- Folliculitis
- Cellulitis
- Pyomyositis
- Clostridial myonecrosis
- Necrotizing fasciitis
Skin & Soft Tissue Infections

• Cellulitis (fever, hills, general malaise)

• Gas gangrene (toxins necrotize the muscle and release gas, producing the classic symptoms of swelling with purple or bronze discoloration) patients can become quickly toxic and pain is usually severe

• Patients with necrotizing fasciitis may have skin discoloration, blisters, skin drainage, crepitus, and swollen gland near affected site
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Rheumatoid Arthritis

• Systemic autoimmune disease
• Characterized by chronic joint inflammation that most commonly affects peripheral joints
• This process results in the development of pannus, a destructive tissue that damages cartilage.
• Can affect organs
  – Sjogren’s Syndrome (inflammation of glands)
  – Lungs: pleuritis, nodules of lungs/scarring
  – Cardiac: pericarditis
  – Anemia/leukopenia
  – Felty’s syndrome (enlarged spleen)
  – Vasculitis (necrosis)
Rheumatoid Arthritis

• Cause is unknown

• ? Genetic component
  – HLA (human leukocyte antigen)
    – rural Nigeria – no individuals are affected with RA
    – Some Native American tribes – incidence 5%

• ? Infectious agent (viruses, bacteria, fungi)

• ? Environmental factors
  – Smoking increases risk of developing RA
RA Pathophysiology

Source: Goldman: *Cecil Medicine*, 23rd ed
RA Epidemiology & Demographics

• Prevalence:
  – 5 to 10 cases/1000 adults.
  – most common autoimmune disease in the world
  – Affects approximately 1.2 million people in US

• PREDOMINANT SEX:
  – Female/male ratio of 3:1
  – After age 50 yr, sex difference less marked

• PREDOMINANT AGE:
  – 35 to 45 yr
RA Physical Findings & Clinical Presentation

• Onset gradual
  – common prodromal symptoms of weakness, fatigue, and anorexia (can occur months before presentation of joint sx)

• Initial presentation:
  – multiple symmetric joint involvement
    – hands and feet, usually metacarpophalangeal, metatarsophalangeal, and proximal interphalangeal joints
    – Joint effusions, tenderness, and restricted motion usually present early in the disease
  – Eventual characteristic deformities: subluxations, dislocations, joint contractures
Comparison of RA and OA

Rheumatoid Arthritis

Osteoarthritis

Source: Goldman: Cecil Medicine, 23rd ed
RA Physical Findings & Clinical Presentations

Source: Moser & Riegel: Cardiac Nursing, 1st ed
RA Differential Diagnosis

- Systemic lupus erythematosus (SLE)
- Seronegative spondyloarthropathies
- Polymyalgia rheumatica (PMR)
- Acute rheumatic fever
- Scleroderma
RA Diagnosis Criteria

- ACR
  - rheumatoid arthritis exists when four of seven criteria are present, with criteria 1 to 4 being present for at least 6 wk:

1. Morning stiffness >1 hr
2. Arthritis in three or more joints with swelling
3. Arthritis of hand joints with swelling
4. Symmetric arthritis
5. Rheumatoid nodules
6. XR changes typical of RA
7. Positive serum rheumatoid factor
RA Laboratory Tests

• +RF (rheumatoid factor)
  – RF is an antibody directed against the Fc region of the IgG that has been used as a diagnostic marker for rheumatoid arthritis.
  – 80% of cases positive in RA
    – (rheumatoid factor also present in the normal population).

• Anti-CCP
  • autoantibodies against cyclic citrullinated peptide (CCP).
  • Anti-CCP autoantibodies are more specific than RF for diagnosing rheumatoid arthritis and may better predict erosive disease.
  • Sensitivity and specificity of the anti-CCP test for RA is 67%
RA Laboratory Test (con’t)

• CBC
  – Possible mild anemia
  – Possible mild leukocytosis

• Elevated acute phase reactants (erythrocyte sedimentation rate, C-reactive protein)

• Arthrocentesis
  – Assess for wbc/crystals/protein/glucose/cultured
RA Imaging Studies

• CXR

• Plain radiography:
  – Reveals soft tissue swelling and osteoporosis early
  – Eventually, joint space narrowing, erosion, and deformity visible as a result of continued inflammation and cartilage destruction

RA Treatment

• NSAIDS
  – Initial tx to relieve inflammation

• Prednisone
  – Oral
  – Intrasyphovial steroid injections
RA Treatment Non Pharmacological

- Diet
  - No special diet
  - Anti-inflammatory diet

- Rest and Exercise

- OT/PT

- Education

- Joint Protection

- Surgical intervention
RA Treatment

• DMARDs
  – Gold
  – Azathioprine (Imuran)
  – Cyclosporine
  – Hydroxychloroquine sulfate (Plaquenil)
  – Leflucomide (Arava)
  – Methotrexate (Rheumatre, Trexall)
  – Minocycline (Minocin)
  – Sulfasalazine (Azulfidine)
RA Treatment

• Biologic DMARDS
  – Abatacept (Orencia) T Cell- IV infusion Monthly
  – Adalimumab (Humira) TNFa-(SQ inj q 2 weeks)
  – Anakinra (Kineret) IL-1-injected daily
  – Certolizumab pegoi (Cimzia) –TNFa- SQ monthly
  – Etanercept (Enbrel) TNFa- (SQ weekly or twice weekly)
  – Golimumab (Simponi) TNFa-SQ monthly
  – Infliximab (Remicade) TNFa-IV infusion q6-8 weeks
  – Rituximab (Rituxan) B cell- IV infusion
  – Tocilizumab (Acterma) IL-6 (IV monthly)
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Osteoarthritis-OA

• **Pathophysiology:**
  - Cartilage degeneration
  - Thickening of subchondral bone
  - Formation of osteophytes

**Cause:**
- No single cause
- Idiopathic or Secondary

**Risk Factors:**
- Age, Sex hormones, Genetic
- Modifiable - ↑ weight, ↓ activity
OA- Clinical Manifestations

• Joint Pain - 1° Symptom
  – Localized, asymmetrical
  – Increases with use

• Stiffness - Gelling
  – Improves with activity, <30 mins
  – May have crepitus, effusion

• Joint Deformity
  – Heberdens, Bouchards
  – Leg deformities
Diagnosis

- **H & P** – Most often sufficient to diagnose OA

- **Labs** – CBC
  - Renal & Liver panel
  - RF & ESR

- **X-Ray** - Osteophytes, narrowing joint space

- **MRI**
OA - Management

- Exercise – Walking, swimming, water aerobics, Yoga
- Activity Modification – Periods of activity followed by rest
- Weight Reduction
- Heat & Cold
- Pharmacologic – Acetaminophen recommended
  NSAIDS – Salicylates
  COX-2 Inhibitors
  Intra-articular Corticosteroids
- Surgical - Osteotomy, Arthrodesis, Arthroplasty
Spinal Column Deformities: Scoliosis

- Idiopathic Scoliosis
- Congenital Scoliosis
- Neuromuscular Scoliosis
- Post-irradiation Scoliosis
- Non-structural Scoliosis
Scoliosis

- Lateral curvature of the spine with vertebral rotation
- Curvature described as structural or non-structural
- A structural curvature does not correct itself on forced bending against the curvature
- A non-structural curvature is one that is corrected on forced bending
Idiopathic scoliosis

• Most common form of scoliosis
• Cause is unknown
• Occurs in normal, healthy growing children who have no other apparent issues
• Preadolescents and adolescents most common
• Progressive idiopathic scoliosis occurs more often in girls
Congenital Scoliosis

• Malformation of the body vertebral segment of the spine
• Cause is unknown
• Failure of formation (absence of a portion of vertebra)
• Failure of segmentation (absence of normal separation between vertebrae)
• Incidence is less than 0.5%
Neuromuscular Scoliosis

- Cerebral Palsy
- Syringomyelia
- Polio
- Myelomeningocele
- Spinal muscular atrophy
- Spinal cord tumors
- Muscular Dystrophy
- Myotonia
- Hypotonia
Neuromuscular Scoliosis

• Partial or complete paralysis or the trunk musculature can cause long, sweeping scoliosis
• Higher incidence of compromised health
• Often frail and have decreased pulmonary function
• Surgery is treatment of choice
Classifications of Spina Bifida

- Spina bifida occulta
- Incomplete closure of laminae, one or more vertebrae
- Absence of protrusion of intraspinal contents to surface
- Possible overlying cutaneous defect, neurologic deficit, spinal cord dysplastic changes
Classifications of Spina Bifida

- Meningocele
- Unfused vertebral arches
- Visible meningeal sac filled with cerebral fluid and composed of dura mater or arachnoid, no nerve tissue
- Sensory, motor, reflex status intact
- No sphincter disturbance
Classifications of Spina Bifida

- Myelomeningocele
- Unfused vertebral arches
- Cystic distention of meninges, nerve tissue within or adherent to sac
- Spinal cord myelodysplasia
- Neurologic deficits (sensory, motor, reflex, sphincter) caudal to level of lesion
Tumors

- Diagnosis is often made when there is a history of back pain and an associated onset of spinal deformity.
- Scoliosis in young clients is rarely accompanied by pain.
- If pain is present and consistent, further work-up to rule out spinal tumors should occur.
- Osteoid osteoma is a benign bone tumor often appears as painful scoliosis first.
- Localized back pain that is exacerbated at night.
Post irradiation Scoliosis

- Spinal deformities may occur after radiation therapy
- Higher incidence after treatment for Wilms’ tumor or neuroblastoma
- Leads to asymmetrical growth in adjacent growth plates and soft tissues
- Radiation oncologists are able to develop a treatment plan to reduce risk for development
Kyphosis

- Posterior rounding at the thoracic level of the spine
- Curvatures greater than 45 degrees
- Considered postural if an individual can voluntarily hyperextend the spine to correct the curvature
Neuromuscular Kyphosis

• Kyphosis can be associated with neuromuscular disorders such as:
  • Cerebral Palsy
  • Spinocerebral degeneration
  • Spinal muscle atrophy
  • Muscular Dystrophy
Nursing History: Spinal deformity

• Developmental milestones
• Onset of deformity
• Leg length discrepancies
• Symptoms of pain or weakness
• Family history
• Patient perception of problem and/or concerns
Nursing Assessment: Spinal Deformity

• Complete orthopaedic and neurologic examination should be performed

• Any evidence of unusual gait, weakness, abnormal reflexes or sensation should be a cause for concern and evaluated

• Cysts, tumors, or herniated nucleus pulposus can cause spinal deformity
Screening Assessment

• The patient is first observed from the back

• Standing with equal weight on both feet, arms hanging freely at the sides and relaxed

• Evaluation of symmetry of the shoulders, scapula, waist, and arm length

• Ask patient to place fingertips together (as if diving into a pool) and bend forward

• Observation for thoracic rib prominence or paravertebral prominence can be used

• Facing the examiner look for symmetry of the shoulders, breasts, anterior rib cage, waist creases, and arm length
Treatment Modalities and Nursing Management

• Nonsurgical treatment includes: observation, braces, exercise regimens

• Individual traits and personalities must be considered for treatment to be successful

• Braces (best known Milwaukee)

• Bracing for scoliosis or kyphosis is complex

• A full-time brace program can place emotional stress on an adolescent
Treatment Modalities and Nursing Management

- Common problems with braces is skin irritation and breakdown
- Meticulous skin care
- Cotton T-shirts should be worn under the brace
- Patients are told to gradually increase the time spent each day wearing the brace
- Some patients may have difficulty eating with a brace on
Patient education

• Hygiene – daily shower and changing T-shirt under brace
• Watch for skin irritation
• If a sore develops, discontinue brace and call the nurse or physician immediately
• Do not use lotion or power under the brace
• Bracing is necessary until growth is complete, which usually occurs 2 years after the onset of menses in females
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Low Back Disorders

- Low back strain
- Herniated nucleus pulposus
- Spondylolysis
- Spondylolisthesis
- Spinal stenosis
Low Back Strain

• Most common cause of back pain
• Often occurs following a change in activity, and not necessarily related to trauma to the lower back
• An activity as common as house cleaning could trigger a bout of low back pain
Herniated Nucleus Pulposus

- Narrowing of the spinal canal and bulging or extrusion of the disc material into the canal
- The disc then exerts direct contact on neural structures
- The nucleus pulposus (termed bulging) may or may not cause significant problems
- The size of the spinal canal, the location of the defect, and the relative quantity of nucleus pulposus present all influence the treatment plan
- If neurologic deficit is present (marked weakness, bowel or bladder difficulties) surgical intervention may be necessary
Spondylolysis

- Defect or break in the neural arch between the superior and inferior articulating processes
- The union between these two areas is normally bone
- In spondylolysis it is composed of fibrocartilaginous tissue
Spondylolisthesis

• Forward subluxation of one vertebra on another

• The condition can develop at an early age, but does not usually become symptomatic until later childhood or adolescence
Spinal stenosis

• Narrowing of the spinal canal
• CT scan or myelogram
• Stenosis can be congenital or degenerative
• Can occur in any region of the spine
• Significant neurologic compromise may occur if a narrowed canal is invaded by disc material
• Higher incidence with older adults due to natural degeneration and arthritic changes
Nursing History Assessment: Spinal Stenosis

- Focus on chief complaint symptoms such as: back or leg pain, numbness, weakness, etc.
- Include history of how patient is coping with the problem or disability
- Patients with chronic pain often have a difficult time coping with the situation
Physical Assessment

- Include orthopaedic and neurologic examination
- Observe ease with which patient is able to move around the examination room
- Evaluate gait (limp, lurch, weakness)
- Reflex testing
- Motor strength of all muscle groups in the lower extremities
- Lower extremity pulses (vascular dx can mimic spinal radiculopathy)
Physical Assessment

• A patient with a herniated nucleus pulposus may describe a specific incident that led to immediate leg pain and is typical of the acute disc rupture

• A small tear in the annulus may allow the nucleus to rupture slowly, giving a picture of gradual but persistent onset of radicular pain

• The patient may also note increased pain with sneezing, coughing, or the Vasalva’s maneuver
Physical Assessment

- Spondylolisthesis patients usually have a history of low back pain, sometimes radiating into the lower extremities.
- Increased lumbar lordosis and a waddling gait are common with more severe subluxation.
- Most patients will be unable to touch their toes, and straight leg raise is limited.
- Bowel and bladder difficulties, as well as decreased motor reflex and sensation may be present.
- A patient with spinal stenosis may describe leg pain that begins after walking a short distance.
Management

Acute Low Back Pain

• Measures to decrease inflammation
  Analgesics – Tylenol
  NSAIDS - COX-2 Inhibitors
  Muscle relaxants

• Bed Rest – Short term

• Heat & Cold

• Exercises – Aerobics
  Abdominal strengthening

• Physical Therapy – Reconditioning Exercises

• Walking

• Acupuncture
Management

Surgical Interventions

• Laminectomy
• Spinal Fusion
• Microdiskectomy
Cervical Spine Disorders

• The cervical spine is reliant on the tendons, muscles, bony anatomy, and disc bonds for stability

• It lacks the additional protection of the visceral organs, ribs, and large groups of muscles, as are found in the thoracic and lumbar spine

• Smaller diameter of spine canal

• Cervical spine disease can have potential catastrophic outcomes if undetected and untreated
Neurologic Monitoring

• An examination of both the upper and lower extremities should be performed after any spinal surgical procedure.

• For lumbar surgery, the examination can be focused on the lower extremities.

• Any deviation from normal should be reported.

• Sensory and motor function should be assessed every 2 hours in the first 24 hours.

• Neurologic assessments should be made every 4-8 hours until discharge.
References


• NAON (2013). *Core Curriculum for Orthopaedic Nursing*.

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