The Fundamentals of Orthopaedic Patient Care

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Conflict of Interest

I hereby certify that, to the best of my knowledge, no aspect of my current personal or professional situation might reasonably be expected to affect significantly my views on the subject on which I am presenting.

Objectives

1) Describe key nursing assessment parameters and interventions for the orthopaedic patient

2) Identify common orthopaedic complications and emergencies
Orthopaedic Conditions

- Total Joint Arthroplasty (hip, knee & shoulder)
- Trauma including hip fractures
- Spine surgery
- Sprains/Strains

Incidence of Total Joint Arthroplasty

- Annually, 581,000 Americans have a total knee arthroplasty and 193,000 have a total hip arthroplasty
- It is predicted that between 2006 and 2016, annual hip and knee replacements will increase from 907,000 to 1.3 million

(Cress, Pelton, Thayer and Bukrey, 2010)

Total Knee Arthroplasty

Arthritic Knee  Indicated when conservative management fails including analgesics, NSAIDS and physical therapy
Total Knee Arthroplasty (TKA)

- Metal components for the femur and tibia
- Plastic liner “new cartilage”
- May resurface kneecap or patella

Knee Precautions

- Do not stand, bend knees, and twist at the same time
- Do not put more weight on affected leg than instructed

Management of the Patient with a TKA

- Physical Therapy to promote extension and flexion of the knee.
- Early mobility (Day 0) is effective for improved outcomes and decreased LOS
- Pain Management to enhance participation in mobilization and reduce complications
- Venous thromboembolism (VTE prophylaxis)
- Monitor incision for signs and symptoms of infection.
Osteoarthritis Hip

Normal Hip

Arthritic Hip

Hospital for Special Surgery Website, HSS.edu

Total Hip Arthroplasty (THA)

- Metal stem inserted into femur
- Metal cup inserted into natural cup in the pelvis
- Polyethylene plastic liner and femoral head may be comprised of metal or ceramic

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Hip Precautions

- Do not cross your legs

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**Hip Precautions**

- Do not twist your body when standing.

**Abductor Pillow**

- Used to prevent crossing legs.
- Loosely apply straps to prevent peroneal nerve damage. The nerve runs laterally along the tibia.
- Inability to dorsiflex foot.
Management of the Patient with a THA

- Early mobility (Day 0) is effective for improved outcomes and decreased LOS
- Pain Management to enhance participation in mobilization and reduce complications
- Venous thromboembolism (VTE prophylaxis)
- Monitor incision for signs and symptoms of infection.

Orthopaedic Complications

Hip dislocation
Displacement of the femoral head from the acetabulum
- Trauma such as motor vehicle accident or total joint arthroplasty
- Severe pain, pop or inability to weight bear
- Assess for internal or external rotation of the extremity and neurovascular status.
- X-ray for confirmation
- Closed reduction versus open reduction

Poll Question

How many of the participants are performing anterior approach for total hip arthroplasty?
Anterior Total Hip Arthroplasty

- Technique first described in 1947 by Judet
- Recently popularized by Joel Matta
- Can be performed with or without fracture table
- Anterior incision in interval between sartorius and tensor fascia latae

Anterior Total Hip Arthroplasty - Hana Table

Benefits: quicker recovery, less pain, eliminate need for post op hip precautions

Complications: nerve damage, fracture, learning curve for technique
Anterior Total Hip Arthroplasty

- Recovery similar to that of posterior or anterolateral THA but may not require:
  - Total Hip Precautions
  - Abductor Pillow
  - Incision anterior hip

Reverse Total Shoulder Arthroplasty

- FDA approved in 2003 in US
- Indication: Large rotator cuff tear or cuff tear arthropathy
- Deltoid instead of rotator cuff for muscle function

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Management of the Total Shoulder Patient

- Pain Management: may use perineural infusion (PNI)
- Occupational Therapy for ADLs
- VTE prophylaxis
- Positioning of affected extremity
- Typical LOS is 2 days

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Slings

- Upper extremity: clavicle fracture, upper extremity surgery, after shoulder surgery (rotator cuff repair) or immobilizer for total shoulder

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Surgical Care Improvement Project

- SCIP 1: Pre-op antibiotics within 1 hour of procedure start
- SCIP 2: Appropriate antibiotic selection
- SCIP 3: Antibiotics discontinued within 24 hours of anesthesia end time
Pulmonary Embolus

- VTE prophylaxis
  - Pharmacological: unfractionated heparin, low molecular weight heparin, warfarin
  - Mechanical: pneumatic compression devices, graduated compression devices and early mobility
- Signs and Symptoms (usually occurs within 72 hours)
  - Restlessness, confusion
  - Dyspnea and pleuritic chest pain
  - Tachycardia
  - Homan’s sign is not reliable

Orthopaedic Emergencies

Pulmonary Embolus (PE): A clot that has dislodged from primary site to right side of heart.
- Multiple risk factors:
  - Age
  - Pelvic, hip, spine and lower extremity surgery
  - Surgery greater than 30 minutes
  - Virchow’s triad (venous stasis, hypercoagulability and intimal injury)
  - Prevention is key

Pulmonary Embolus

- Diagnostic studies
  - CXR, Spiral CT, Lung Scan
  - ABGs
- Treatment
  - Oxygen
  - Vital signs
  - Maintain airway
  - Anticoagulation (IV heparin + warfarin)
  - Monitor lab values
Trauma

- Multiple Trauma - 5th most common cause of death in the United States

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Trauma

- The American College of Surgeons has developed systematic evaluation in Advanced Trauma Care:
  - A- Airway
  - B- Breathing
  - C- Circulation
  - D- Disability
  - E- Exposure

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Amputation

- Result of trauma, tumor, vascular disease

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Residual Limb Care

- If upper extremity, usually recommend elevation
- If lower extremity, do not elevate in order to avoid contratres
- May be wrapped in ace, stump shrinker or cast
- Phantom pain is real and needs to be acknowledged and treated
  - Beta blockers
  - Antiepileptics
  - Emotional support

Poll Question

How many of the participants are using a pain management protocol for residual limb pain?

Orthopaedic Emergencies

- Compartment Syndrome - due to prolonged compression from casts, fracture or surgery
  - Muscle damage can occur in as early as 4 hours.
Compartment Syndrome

- **Assessment**
  - Pain - out of proportion and not responsive to narcotic analgesics
  - Paresthesias - feels like pins and needles
  - Pressure - tense or tight compartment, edematous, shiny skin
  - Pallor - extremity appears pale
  - Paralysis - loss of function of limb
  - Pulselessness - way too late of sign

Compartment Syndrome

- **Treatment**
  - Relieve pressure (bi-valve cast)
  - May check compartment pressures (normal is 8 and above 30 indicates needs for fasciotomy)

Orthopaedic Emergencies

**Fat Embolism Syndrome (FES)** - presence of fat globules in the pulmonary circulation.
- Most common in long bone fracture (femur) and in young, healthy adults.
- Signs and symptoms - apprehension, restlessness, petechiae, right sided heart failure and Acute Respiratory Distress Syndrome (ARDS)
- Diagnosis - CXR reveals snow storm pattern, lab values including ABGs (respiratory acidosis)
Fat Embolism Syndrome

Treatment
- Airway management
- Elevate HOB
- Oxygen
- Vital signs
- Anticipate transfer to ICU

Orthopaedic Emergencies - Knee Dislocation

Rare but considered an orthopaedic emergency
- Blunt force or trauma to knee (MVA)
- High risk for popliteal artery injury
- May have gross deformity with taut skin and pulse deficit
- Surgery - may not be able to revascularize after 8 hours of ischemia

External Fixator

- Immobilization percutaneous wires/pins and rigid frame to stabilize fracture
- Pin care - check hospital policy
- Chlorhexidine may be most effective
**Hip Fracture**

- Approximately 23.8% mortality with 1st year
- In 2040, predicted to be greater than 500,000 hip fractures.
- Question: Did the fracture happen 1st then fall or fracture then fall?

**Femoral Neck Fracture**

- Most common in elderly females
- Femoral Neck
  - Displaced vs. nondisplaced
    - Displaced fractures compromise blood supply to femoral head
  - Treatment depends on displacement
    - Nondisplaced fractures are percutaneously treated
    - Displaced fractures require arthroplasty
- Intertrochanteric
  - Limbs are often shortened and externally rotated in appearance
- No nonsurgical treatment for adult/elderly hip fractures

**Hip Fracture Images**

- Images obtained from the Canadian Orthopaedic Foundation’s website (www.canorth.org) and reproduced with permission

**Femoral Neck Fracture**

- Non-Displaced: Blood supply intact
- Displaced: Blood supply likely disrupted

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Displaced Femoral Neck Fracture

Intertrochanteric Fracture
Low risk of blood supply disruption

Nondisplaced Femoral Neck Fracture
Buck's traction

- Skin traction applied to reduce muscle spasms for hip fracture patient waiting for hip fracture repair
- Usually, a 5 pound weight is applied
- Heels should be off the bed

Poll Question

How many of the participants are screening patients for osteoporosis?

Spine

- Compression fracture
- Commonly occurs in elderly female due to osteoporosis or result of trauma
Compression Fracture
- Conservative treatment
- Vertebroplasty vs. Kyphoplasty

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Spine Surgery- Elective or Emergent
- Lumbar Laminectomy
- Anterior Cervical Discectomy with Fusion

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Spine Precautions
- No bending, lifting or twisting (BLTs)
- Common after lumbar spine surgery.
- Usually restrict to no lifting more than 5-10 pounds
- Use of overhead trapeze (based on your protocols)
- Do not sit for greater than 20-30 minutes
- Log roll the patient

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Spine Braces
- May be used after spinal fusion surgery
- Thoracolumbarsacral orthosis (TLSO)- clarify if only when up or must be worn in bed

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Orthopaedic Emergencies

Cauda Equina
- Nerve roots of the spinal canal are compressed and paralyzed. May be caused by hematoma, ruptured disc, tumor, trauma or fracture
- Bladder and bowel dysfunction is a cardinal sign and may be difficult to assess if post op
- Considered a surgical emergency to prevent permanent dysfunction
Anterior Cervical Discectomy with Fusion

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Care of the Patient with Anterior Cervical Discectomy with Fusion

- Head of Bed Up at least 30 degrees
- Suction set up at bedside
- Pain management
- Brace care
- Assess for neurovascular status
- Assess patient for neck swelling and dysphagia

Cervical Braces

- Clarify if must be worn at all times
- Can it be removed for shower?
- Check for skin breakdown

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Poll Question

How many of the participants are using tranexamic acid?

Common Orthopaedic Complications

Acute blood loss from surgery
- Assess incision
- Assess vital signs (increased HR, decreased BP)
- Assess drainage output - some physicians may leave parameter for amount of ml / hours to decompress
- CBC or H & H - check hemoglobin
- PT/INR - International normalized ratio (used to monitor warfarin). If increased, need to contact physician (may need to administer Vitamin K)

Sports Injuries

Sprains and Strains
Strains

- Strains
  - Traumatic injury to a muscle or tendon caused by indirect force (i.e., muscle contraction)
    - Passive stretch of muscle past its resting length
  - First degree
    - Mild stretching of tissue with minimal damage
  - Second degree
    - Partial tearing of tissue
  - Third degree
    - Severe stretching leading to complete rupture
  - Recurrence of injury will lead to greater severity the second time around

Strains: Assessment

- First degree
  - Symptoms
    - Gradual onset not until several hours after injury
    - Area will feel stiff or sore
  - Exam
    - No loss of range of motion
    - Tenderness
    - Possible muscle spasm
    - No edema or ecchymosis

Strains: Assessment

- Second degree
  - Symptoms
    - Sudden pain which subsides, leaving area tender
  - Exam
    - Extreme spasm
    - Passive motion causes pain
    - Edema appears soon after
    - Ecchymosis can take several days or hours to occur
**Strains: Assessment**

- Third degree
  - Symptoms
    - Sudden tearing, snapping or burning
    - Diminished ability to move a body part
  - Exam
    - Spasm
    - Tenderness
    - Edema
    - Delayed ecchymosis
    - Contracting muscle will not produce motion
    - Possible palpable muscle bulge

**Sprains**

- A type of traumatic joint injury in which the surrounding ligament fibers have been damaged by excessive stretching or exertion
  - Sometimes described as a twisting injury or forced hyperextension of the joint
- Grade 1
  - Minimal damage to ligament
- Grade 2
  - Partial ligament tear
- Grade 3
  - Complete ligament tear, may result in an avulsion fracture

**Strains & Sprains: Treatment**

- RICE
  - Rest
  - Ice
    - Decreases bleeding from injured blood vessels
    - Soft tissue blood flow decrease 25% after 20 minutes of ice
    - 30 minutes on and 15 minutes off while awake for first 72 hours
  - Compression
  - Elevation

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Knee Immobilizer

- Utilized after knee surgery or patellar subluxation or quadriceps rupture.
- Hinged braces allows for bending based on physician’s orders.

Questions for All Braces

- Must it be worn at all times?
- Can it be removed for showering or bathing?
- How long must it be worn?
- Vigilant skin assessment

Cast Care

- Neurovascular assessment for swelling and pain
- Keep clean and dry
- Inspect integrity of cast (no soft spots or cracks)
- Elevate
Orthopaedic Nursing Assessment

- **Neurovascular assessment:**
  - Color: pink (normal), pale (inadequate arterial supply), cyanotic (possible inadequate venous return)

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Neurovascular Assessment

- **Temperature**: (warm)
- **Capillary refill**: normal less than or = 2 seconds
- **Peripheral pulses**:
  - 0 = no palpable pulse
  - 1 = weak, barely palpable
  - 2 = palpable
  - 3 = strong, easily palpable
  - 4 = bounding

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Neurovascular Assessment

- 8 different pulse points
- Focus on dorsalis pedis
Neurovascular Assessment

- **Edema**: important to monitor for increased swelling as this can lead to neurovascular compromise
- **Sensation**: Ask patient “Where are you touching?” rather than “Do you feel this?”
- **Pain**: constant, intermittent, dull or burning

**Grade Muscle Strength**
- 5: Normal strength
- 4: movement against gravity with some resistance
- 3: no resistance, some movement against gravity is possible
- 2: very weak motion, movement is dependent on position or gravity assisted
- 1: muscles contract but are ineffective with no movement
- 0: no muscle contraction, no movement

**Documentation:**
- Baseline
- Based on neurovascular assessment orders
- Report any differences
- If doppler used for pulses, document as doppler signal
Gait Patterns

- **Antalgic**: abnormal gait due to painful weight-bearing
- **Neurogenic**: uncoordinated gait may include foot slapping
- **Trendelenburg**: duck-like or sailor’s sway in which pelvis drops on unaffected side due to weak abductors

Weight Bearing Status

- **Full weight bearing (FWB)**: no restriction on weight bearing
- **Weight bearing as tolerated (WBAT)**: can bear as much weight as comfort and tolerance allows
- **Partial Weight bearing (PWB)**: clarify if 25 or 50%
- **Non-weight bearing (NWB)**: no weight allowed on extremity

Proper Fit of Walker

- Too Tall
- Just Right
- Too Low

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Crutches and Cane

- Up with the good, down with the bad

Special Considerations

- Pediatrics
  - Not small adults
  - Fractures: greater remodeling than adults and heal quicker (reduction should be done sooner)
  - Do not always verbalize pain well

Special Considerations

- Elderly
  - Mental Status changes: increased risk of delirium after age 60 (16-62%)
  - Co-morbidities factor into care (respiratory, heart disease and diabetes)
  - Altered metabolism: more sensitive to opiates
**Poll Question**

How many of the participants are using IV ofirmev (Tylenol)?

**Roles of Therapy**

- **Physical Therapy**
  - Muscle strengthening via exercises
  - Range of Motion
  - Instruct on assistive devices
  - Teach stairs
- **Occupational Therapy**
  - Pacing, Energy Conservation, Maintaining precautions
  - Assist patient in activities of daily living
  - Getting in and out of car or shower
  - Adaptive Devices

**Adaptive Equipment**

- Sock Aide
- Reacher
- Leg Lifter

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Toilet Transfers

- Raised Toilet Seat
- Bedside commode

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Shower/Tub Transfers

- Shower Chair
- Tub Transfer Bench

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Orthopaedic Nurses

- Now when you walk into the room, you will think like an ortho nurse.
- Activity - what is their activity level? bedrest, out of bed first time
- Any assistive device, braces?
- Weight bearing? NWB, PWB, FWB, WBAT
- Precautions - hip precautions, logrolling, HOB up
- Nurse - neurovascular status and pain management
Thank you!!

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