REST & ACTIVITY NEEDS – MUSCULOSKELETAL SYSTEM

Fall 2019 - Spring 2020

- Musculoskeletal Trauma and Orthopedic Surgery
- Low back pain and Intervertebral disc disease
- Osteomyelitis
- Osteoporosis
- Osteoarthritis
- Rheumatoid Arthritis
- Systemic Lupus Erythematosus

*Describe each concept
*What nursing physical assessments are involved?

The Concept of Mobility

<table>
<thead>
<tr>
<th>Alteration</th>
<th>Description</th>
<th>Manifestation</th>
<th>Intervention and Therapies</th>
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<tbody>
<tr>
<td>Fractures</td>
<td>A break in the continuity of a bone</td>
<td>• Pain from damage to surrounding tissue</td>
<td>• Ice packs to limit swelling</td>
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<td></td>
<td></td>
<td>• Visible fracture on x-ray</td>
<td>• Pharmacologic therapy to reduce pain and swelling,</td>
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<td></td>
<td>• Protrusion of bone out of skin</td>
<td>and prevent infection</td>
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<td></td>
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<td>• Limited mobility</td>
<td>• Immobilization with a splint, brace, cast, or traction</td>
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<td>• Surgery to stabilize bone or replace fractured bone</td>
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Audience Response Question

A patient has a severely sprained ankle from a sports injury. What should the nurse teach the patient prior to discharge from the urgent care center?

a. Alternate cold and heat for 30 minutes each until symptoms are relieved
b. Apply cold for 20 to 30 minutes with breaks of 10 to 15 minutes during the first 2 days
c. Use continuous cold for the first 24 hours and then continuous heat until the symptoms are relieved
d. Apply continuous heat to the ankle for the first 24 hours and then continuous cold until the symptoms are relieved

REST & ACTIVITY NEEDS – RISK FACTORS

• Traumatic Injuries
• Pathologic
  ◦ Recall your knowledge: Name a disease from endocrine unit?
  ◦ Disruption or break in continuity of structure of bone

Classification

Classification According to Location

Based on direction of fracture line
- Linear
- Oblique
- Transverse
- Longitudinal
- Spiral

Displaced or nondisplaced

Displaced: two ends separated from one another (comminuted or oblique)
Nondisplaced: periosteum is intact and bone is aligned (transverse, spiral, or greenstick)
**Fracture Healing**

Multistage healing process (union)
1. Fracture hematoma — first 72 hours
2. Granulation tissue — 3 to 14 days
3. Callus formation — end of 2nd week
4. Ossification — 3 weeks to 6 months
5. Consolidation — up to 1 year
6. Remodeling

**Neurovascular Assessment**

- Peripheral vascular:
  - Color and temperature
  - Capillary refill
  - Pulses
  - Edema
- Peripheral neurologic:
  - Motor function
  - Upper and lower extremities
  - Sensory function — more than “can you feel this”
  - Paresthesia*

**FRACTURE HEALING**

- Factors influencing healing
  - Displacement and site of fracture
  - Blood supply to area
  - Immobilization
  - Internal fixation devices
  - Infection, poor nutrition, or systemic disease
  - Age
  - Smoking
REST & ACTIVITY NEEDS:
DIAGNOSTIC STUDIES

<table>
<thead>
<tr>
<th>Physical Examination</th>
<th>Surgical Patient:</th>
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<tbody>
<tr>
<td>X-ray</td>
<td>• BMP/CMP</td>
</tr>
<tr>
<td>CT/MRI</td>
<td>• CBC</td>
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<tr>
<td></td>
<td>• PT/INR/PTT</td>
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<td>• T&amp;S, T&amp;C</td>
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<td>• ECG</td>
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<td>✓ Medical clearance</td>
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Audience Response Question

A plaster splint is applied with an elastic bandage to the leg of a patient with a fractured tibia in preparation for open reduction and internal fixation. The patient complains of increasing pain in the affected leg and foot that is not relieved by loosening of the elastic bandage. The most appropriate action by the nurse is to
a. Elevate the leg on two pillows
b. Apply ice over the fracture site
c. Notify the health care provider
d. Perform neurovascular assessment of the foot

Medical Management – Nonsurgical (CASTS/SLING)

- Upper/Lower Extremity:
  - Temporary
  - Allows patient to perform many normal activities of daily living
  - Posterior splint
  - Short/long cast
- Sling – to support and elevate arm
- Immobilizers
  - permits close observation of the affected joint for signs of swelling and skin breakdown + ROM
- Elevate extremity above heart
- Do not place in a dependent position
- Observe for signs of compartment syndrome and increased pressure
Medical Management – Nonsurgical
Ambulatory Care – Cast Care

• **DO**
  - Neurovascular assessments
  - Ice for first 24 hours
  - Elevate if compartment syndrome
  - Exercise joints above and below
  - Heart first 48 hours
  - Remove padding
  - Insert objects inside cast
  - Exercise joints above and below
  - Report:
    - Increasing pain despite elevation, ice, and analgesia
    - Swelling associated with pain and discoloration OR movement
    - Burning or tingling under cast
    - Sores or foul odor under cast

• **DO NOT**
  - Elevate if compartment syndrome
  - Get cast wet
  - Cover cast with plastic for prolonged period
  - Remove cast
  - Insert objects inside cast
  - Exercise joints above and below
  - Bear weight for 48 hours

Medical Management – Nonsurgical

• **Closed reduction internal fixation**
  - Manual realignment of bone
  - Traction and countertraction applied
  - Under local or general anesthesia
  - Procedural sedation (moderate); protect ABC
  - Immobilization afterwards
  - X-ray for confirmation

Medical Management – Nonsurgical (TRACTION)

**PURPOSE:**
- Prevent or ↓ pain and muscle spasm
- Immobilize joint or part of body
- Reduce fracture or dislocation
- Treat a pathologic joint condition

**How does it work?**
- Pulling force to attain realignment – countertraction pulls in opposite direction
- Two most common types of traction
  - Skin traction
  - Skeletal traction

PURPOSE:
- Prevent or ↓ pain and muscle spasm
- Immobilize joint or part of body
- Reduce fracture or dislocation
- Treat a pathologic joint condition
Skin Traction

- Short-term (48-72 hours)
- Tape, boots, or splints applied directly to skin
- Traction weights 5 to 10 pounds
- Skin assessment and prevention of breakdown imperative

Skeletal Traction

- Long-term pull to maintain alignment
- Pin or wire inserted into bone
- Weights 5 to 45 lbs (sandbags)
- Risk for infection
- Complications of immobility

- Maintain continuous traction
- Keep weights off the floor
- Proper positioning
TRACTION – PIN SITE CARE
- Inspect exposed skin
- Monitor pin sites for infection
- Pin site care per policy
- Exercise as permitted
- Psychosocial needs

EXTERNAL FIXATOR
- Metal pins and rods
- Applies traction
- Compresses fracture fragments
- Immobilizes and holds fracture fragments in place
- Assess for pin loosening and infection
- Patient teaching
  - Home pin site care
  - S&S of ______________

Medical Management – Surgical (OPEN REDUCTION INTERNAL FIXATION)
- Surgical incision
  - Risk for infection (hardware*)
  - Early ROM of joint to prevent adhesions
  - Facilitates early ambulation
Interprofessional Care
Surgical Therapy

SURGICAL THERAPY:
Preoperative Care
- Surgical Anesthesia consent
- Pre-op labs/x-rays
- Medical clearance

• Open Reduction Internal Fixation (ORIF)
• Intramedullary Nailing (IMN)
• Wound washouts and debridement
• Soft tissue skin graft (STSG)
  - Full, split-thickness,

SURGICAL THERAPY:
Preoperative Care
- Surgical Anesthesia consent
- Pre-op labs/x-rays
- Medical clearance

• Immobilization
• Degrees of weight-bearing
  - NWB, TDWB, WBAT, Ad lib
• Assistive devices
• Expected activity limitations
  - Pre/post
• Assure that needs will be met
• Pain medication/Pain management**

SURGICAL THERAPY:
Pre/Post-op teaching
- NPO post MN + IVF*

- Monitor vitals
- Surgical site for bleeding
- Monitor drainage systems
  - Aseptic technique
  - Blood salvage and reinfusion
- Frequent neurovascular assessments
- Pain management
  - Opioid and non-opioid analgesia
  - Bowel regimen meds too

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### Interprofessional Care

**Surgical Therapy:**

- **Central and peripheral muscle relaxants**
  - Cyclobenzaprine (Flexeril)
  - Methocarbamol (Robaxin)
- **Antibiotics (IV/PO)**
- **Bone-penetrating antibiotics**
- **Tetanus and diphtheria toxoid**

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### Interprofessional Care

**Surgical Therapy:**

- **Pain management**
  - Nerve block administered during surgery
  - Patient-Controlled Analgesia Pump (PCA) *
  - Continuous SQ infusion

- **Constipation**
  - Mobility as tolerated, fluids/fiber
  - Docusate, polyethylene glycol, sennosides, bisacodyl
- **Cardiopulmonary deconditioning**
  - Mobility as tolerated
  - Incentive spirometer
- **DVT/pulmonary emboli**
  - Mobility as tolerated
  - Sequential compression devices (SCD); elastic stockings
  - Enoxaparin, Heparin, Fondaparinux, Warfarin, Apixaban, Rivaroxaban

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### Interprofessional Care

**Surgical Therapy:**

**EXPECTED OUTCOMES:**

- Report satisfactory pain management
- Appropriate care of cast or immobilizer
- No peripheral neurovascular dysfunction
- Uncomplicated bone healing

**DISCHARGE INSTRUCTIONS:**

- Follow-up appointment
- Reinforce physical therapist's instructions
- Mobility training
- Instruction in use of assistive aids
- Pain management
- Discharge medications
**Complications of Fractures**
- Death is usually the result of:
  - Damage to underlying organs and vascular structures
  - Complications of fracture or immobility
- May be direct (i.e., infection) or indirect (i.e., compartment syndrome, VTE, FES)

**Complications**
- Infection – what type of fracture?
- Compartment Syndrome
  - Fasciotomy
  - Rhabdomyolysis
- Venous Thromboembolism
- Fat Embolism (FES)

**INFECTION**
- Open fractures and soft tissue injuries
- Can lead to chronic osteomyelitis

What S&S should the nurse be alert to?
1. T
2. W
3. S

Treatment:
- Aggressive surgical debridement
- Wound may or may not be closed
- Closed suction drainage (WoundVac)
- Skin grafting
- Antibiotics – irrigation, impregnated-beads, and IV

**COMPARTMENT SYNDROME**
- Swelling and increased pressure within a confined space
- Compromises neurovascular function of tissues within that space
- Usually involves the leg but can occur in any muscle group

- Two basic types of compartment syndrome
  - ↓ Compartment size
  - ↑ Compartment contents
- Arterial flow compromised → ischemia → cell death → loss of function
- Worst outcome = amputation
  - A medical emergency
Compartment Syndrome – Clinical Manifestations
• Early recognition and treatment essential
• May occur initially or may be delayed several days
• Ischemia can occur within 4 to 8 hours after onset

• Six Ps
  § Pain
  § Pressure
  § Paresthesia
  § Pallor
  § Paralysis
  § Pulselessness

Early recognition and treatment essential
• May occur initially or may be delayed several days
• Ischemia can occur within 4 to 8 hours after onset

Compartment Syndrome Interprofessional Care
• Prompt, accurate diagnosis via regular neurovascular assessments, performed by RN
  – Notify of pain unrelieved by drugs and out of proportion to injury
  – Paresthesia is also an early sign
• Assess urine output and kidney function – Rhabdomyolysis

Compartment Syndrome Interprofessional Care
• NO elevation above heart
• NO ice
• Surgical decompression (fasciotomy)
  • Prepare for OR
  • Dressing changes
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VENOUS THROMBOEMBOLISM

- High susceptibility aggravated by inactivity of muscles
- Prophylactic anticoagulant drugs
- Antiembolism stockings
- Sequential compression devices
- ROM exercises, Get OOB!

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Fat Embolism (FES)

- Symptoms 24 to 48 hours after injury – “impending disaster”
- Early recognition is crucial – rapid & acute
- Respiratory 1st – dyspnea, tachypnea, hypoxia ➔ respiratory failure (PE, ARDS)
- Neurologic – confusion, restlessness, seizure, coma
- Dermatologic – petechial rash covering upper anterior trunk, arms, neck, buccal mucosa, conjunctiva

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TREATMENT:

- Management is supportive and related to symptom management
- Oxygen administration (mechanical ventilation)
- Fluid resuscitation to prevent hypovolemic shock
- Correction of acidosis
- Replacement of blood loss

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