Preconference Form

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Medical Diagnosis/Disease: Osteoarthritis, THA

NCLEX IV *(8)*: **Physiological Integrity/Physiological Adaptation**

Anatomy and Physiology
Normal Structures

-The musculoskeletal system includes bones, joints, muscles, tendons, and ligaments. It provides structural support, facilitates movement, and protects internal organs. Joints, particularly synovial joints, allow for a range of motion, while cartilage cushions the joints to reduce friction. The system also plays a vital role in mineral storage and hematopoiesis.

1. Skeletal System

The skeletal system consists of 206 bones in the adult human body. It provides the framework for the body and contributes to several critical functions:

Bone Composition:

Bones are composed of:

Compact Bone (Cortical Bone): The dense, hard outer layer that provides strength.

Spongy Bone: A porous inner structure that has bone marrow and aids in distributing forces.

Bone Marrow: Red marrow is involved in hematopoiesis, while yellow marrow stores fat.

Bone Remodeling and Growth:

Bone tissue undergoes continuous remodeling through the actions of**:**

Osteoblasts: Cells that build bone by producing the bone matrix.

Osteoclasts: Cells that break down bone tissue, allowing for calcium release and remodeling.

Osteocytes: Mature bone cells that maintain bone health.

Types of Bones:

Long Bones (ex. femur): Support weight and facilitate movement.

Pathophysiology of Disease

-Osteoarthritis is a chronic, degenerative joint disorder characterized by the breakdown of articular cartilage, leading to pain, stiffness, and loss of joint function. It most commonly affects weight-bearing joints, such as the hips, knees, and spine.

Pathological Changes in Osteoarthritis:

Cartilage Degradation:

Articular cartilage, which cushions joints and allows smooth movement, gradually wears down due to mechanical stress and biochemical changes. This results in bone-on-bone contact.

Matrix Breakdown: Chondrocytes, the cells responsible for maintaining cartilage, produce degrading enzymes, such as matrix metalloproteinases (MMPs), which break down collagen and proteoglycans in the cartilage.

Decreased Proteoglycan Content:

Proteoglycans retain water in cartilage, and their loss leads to reduced shock absorption.

Bone Remodeling and Osteophyte Formation:

As cartilage deteriorates, the underlying bone thickens and forms osteophytes (bone spurs), which can contribute to pain and limit joint mobility.

Subchondral Sclerosis: The bone under the cartilage hardens, reducing the joint's shock-absorbing capacity.

Joint Space Narrowing:

The loss of cartilage leads to a reduced

NCLEX IV *(7)*: **Reduction of Risk**

Anticipated Diagnostics
Labs

***Typically, no specific lab tests are required for OA diagnosis.**

-Synovial fluid analysis may be performed to rule out inflammatory arthritis.

Additional Diagnostics

***Clinical Diagnosis:**

Based on symptoms (pain, stiffness, decreased ROM) and physical examination findings (joint crepitus, bony enlargement).

X-Ray

Can show:

Joint space narrowing,
Osteophyte formation,
Subchondral sclerosis,
Bone cysts.

MRI

Useful in early detection of cartilage damage or when soft tissue involvement is suspected.

Short Bones (ex. carpals): Provide stability and support.
Flat Bones (ex. skull): Protect internal organs.
Irregular Bones (ex. vertebrae): Have complex shapes for specialized functions.

2. Joints /Function

Joints are the points where two or more bones meet. They allow for mobility and flexibility in different parts of the body.
-The hip joint, where Total Hip Arthroplasty (THA) is performed, is a ball-and-socket joint.

Types of Joints by Structure:

Fibrous Joints: Immovable (ex. sutures in the skull).
Cartilaginous Joints: Allow limited movement (ex. intervertebral discs).
Synovial Joints: Freely movable and include:
Ball-and-Socket Joints: Allow for multi-directional movement (ex. hip, shoulder).
Hinge Joints: Permit movement in one plane (ex. knee, elbow).
Pivot Joints: Allow for rotation (ex. neck).

Components of Synovial Joints:

Articular Cartilage: A smooth, white tissue that covers bone surfaces, reducing friction.
Joint Capsule: Encloses the joint cavity and maintains joint integrity.
Synovial Membrane: Produces synovial fluid, which lubricates the joint.
Ligaments: Strong, fibrous tissues that provide joint stability.

3. Muscular System

Muscles are responsible for movement by contracting and pulling on bones. They also maintain posture and produce heat. The three types of muscle tissue include:

Skeletal Muscle (Voluntary):

joint space, visible on imaging, contributing to stiffness and reduced range of motion.

Soft Tissue Changes:
Ligaments and surrounding muscles may weaken due to reduced joint use, further compromising joint stability.

Structure: Made up of muscle fibers containing myofibrils, which consist of sarcomeres (the basic contractile units).
Function: Responsible for body movements and posture**.**

Smooth Muscle (Involuntary):
Found in walls of hollow organs (ex. intestines, blood vessels).
Cardiac Muscle:
Found only in the heart, it contracts to pump blood throughout the body.

4. Tendons and Ligaments
Tendons:
These are tough, fibrous connective tissues that attach muscles to bones.
Function: Transmit the force generated by muscles to create movement.
Ligaments:
Connect bones to other bones, providing joint stability.
-They prevent excessive movement and protect against injury.

5. Cartilage
Cartilage is a specialized, avascular connective tissue. It provides cushioning and reduces friction in joints.
There are three types:
Hyaline Cartilage: Found in joints (including the hip).
Elastic Cartilage: Found in structures like the ear.
Fibrocartilage: Found in intervertebral discs.

6. Connective Tissues and Fascia
Connective tissues support and bind other tissues. Fascia is a type of connective tissue that surrounds muscles, blood vessels, and nerves, allowing for smooth gliding between structures.

7. Neuromuscular Function
The interaction between the nervous and muscular systems is critical for voluntary movement. The process involves:

Motor Neurons: Transmit signals from the brain to muscles.
Neuromuscular Junction: The synapse where a motor neuron communicates with a muscle fiber, triggering contraction.
Proprioception: The body's ability to sense its position and movement, controlled by receptors in muscles, tendons, and joints.

8. Vascular Supply and Innervation
Bones and muscles receive a rich blood supply, which provides nutrients and removes waste. Nerves innervate muscles and joints, enabling movement and sensation.

NCLEX II *(3)*: **Health Promotion and Maintenance**

NCLEX IV *(7)*: **Reduction of Risk**

Contributing Risk Factors	Signs and Symptoms	Possible Therapeutic Procedures Non-surgical	Prevention of Complications (What are some potential complications associated with this disease process)
Age: The risk increases with age due to cumulative wear and tear. **Obesity:** Excess weight places additional stress on weight-bearing joints like the hips and knees. **Joint Injury:** Previous trauma (ex. fractures, ligament tears) can predispose a joint to osteoarthritis. **Repetitive Use:** Occupational or recreational activities that involve repetitive joint stress increase the risk. **Genetics:** A family history of osteoarthritis may increase susceptibility. **Gender**: Women, particularly	**Joint Pain:** Pain is typically activity-related and improves with rest. -In advanced stages, pain may persist at rest or during the night. **Stiffness:** Morning stiffness lasting less than 30 minutes is common. -Stiffness can also occur after periods of inactivity. **Decreased Range of Motion (ROM):** Joint movement becomes restricted due to pain,	**Pain Management:** Acetaminophen, NSAIDs, and topical analgesics, DMOARDS, Corticosteroid injections. **Physical Therapy:** Focus on strength, flexibility, and joint mechanics. **Weight Loss:** Reduces stress on weight-bearing joints. **Assistive Devices:** Canes, walkers, or orthotic supports.	**OA:** **Chronic Pain:** Progressive cartilage loss can lead to persistent pain, even at rest. **Joint Deformity:** Bone remodeling and osteophyte formation may cause visible deformities. **Reduced Mobility and Disability:** Severe OA can lead to significant functional limitations and reduced quality of life. **Depression and Anxiety:** Chronic pain and reduced

postmenopausal, have a higher risk of developing OA.

cartilage loss, and osteophyte formation.

Crepitus:
A crackling/grinding sensation may be felt during joint movement, indicating roughened joint surfaces.

Joint Deformity and Instability:
Progressive cartilage loss can lead to visible joint deformities, such as varus or valgus alignment in the knees.

Swelling:
Mild joint effusion may occur due to synovial inflammation.

Heat & Ice Therapy

Surgical

Total Hip Arthroplasty (THA): A surgical option when conservative measures fail, particularly for severe hip osteoarthritis.

***Total Hip Arthroplasty (THA), also known as hip replacement surgery, involves replacing a damaged hip joint with artificial components.**

-This procedure is typically recommended for patients with severe osteoarthritis or other hip conditions that significantly impair mobility and quality of life.

1. Indications for THA
THA is considered when conservative treatments fail to relieve symptoms or restore function. Indications include:

Severe Osteoarthritis: Most common indication, with pain, stiffness, and loss of function.
Rheumatoid Arthritis: Inflammatory joint disease causing cartilage and bone erosion.
Avascular Necrosis: Loss of blood supply to the femoral head, leading to bone death.
Hip Fractures: Particularly in elderly patients with poor healing potential.
Congenital or Developmental Hip

mobility can negatively impact mental health.
Secondary Conditions: Muscle weakness, weight gain, and cardiovascular issues due to reduced physical activity.

THA:
Infection:
Superficial Infection: At the surgical site.
Deep Infection: Around the prosthesis, potentially requiring revision surgery.
Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE): Blood clots can form in the legs and travel to the lungs.
Prosthetic Dislocation: The new joint can dislocate, especially with improper movement in the early postoperative period.
Loosening or Wear of Prosthesis: Over time, the implant may loosen, necessitating revision surgery.
Leg Length Discrepancy: A slight difference in leg length can occur.
Nerve Damage: Can cause numbness or weakness in the affected leg.
Heterotopic Ossification: Abnormal bone growth in soft tissues around the hip.
Fracture: A femoral fracture can occur during or after surgery.

Disorders: Conditions like hip dysplasia.
Post-Traumatic Arthritis: Following hip injuries.

2. Components of a Total Hip Replacement

THA involves replacing both the acetabulum (hip socket) and the femoral head with prosthetic components:

Acetabular Component: A cup made of metal or a combination of metal and plastic/polyethylene.
Femoral Component: A metal stem inserted into the femur, with a metal or ceramic head that articulates with the acetabular cup.
Bearing Surface: The interface between the femoral head and the acetabular component, which can be metal-on-polyethylene, ceramic-on-ceramic, or metal-on-metal.

3. Surgical Procedure

THA is typically performed under general or regional anesthesia and involves the following steps:

Incision and Exposure:
A surgical incision is made over the hip joint.
The surgeon accesses the hip by cutting through muscles and soft tissue.
Joint Dislocation and Removal:
The femoral head is dislocated from the acetabulum.
Damaged bone and

		cartilage are removed from both the femoral head and acetabular socket. **Implant Placement:** The acetabular component is inserted into the prepared hip socket. -The femoral component is fitted into the femur. Bone cement or a press-fit technique may be used to secure the components. **Reduction and Closure:** The new femoral head is placed into the acetabular cup, restoring joint function. The incision is closed with sutures or staples.	

NCLEX IV *(6)*: **Pharmacological and Parenteral Therapies**

Anticipated Medication Management

OA:

Pain Relief and Inflammation Control:
Acetaminophen (Tylenol):
Indicated for mild to moderate pain.
NSAIDs:
Examples: Ibuprofen, Naproxen, Celecoxib.
-Reduce pain and inflammation in moderate to severe OA.
Topical Analgesics:
Examples: Capsaicin cream, Diclofenac gel.
-Provide localized pain relief with minimal systemic side effects.
Hyaluronic Acid Injections:
Lubricates and cushions the joint, particularly in knee OA.
DMOADS

THA:

Pain Management Post-Surgery:

NCLEX IV *(5)*: **Basic Care and Comfort**

Non-Pharmacologic Care Measures

-Physical Therapy/ Exercise
-Range-of-Motion Exercises
-Weight Management
-Assistive Devices
-Heat and Cold Therapy:
Heat Application:
Applying heat can relax muscles and improve blood flow, easing stiffness and discomfort.
Cold Therapy:
Cold compresses can reduce swelling and numb the pain in inflamed joints.
-Joint Protection Strategies
-Rest and Activity Balance
-Acupuncture and Massage Therapy
-Supplements

NCLEX III *(4)*: **Psychosocial/Holistic Care Needs**

What stressors might a patient with this diagnosis be experiencing?

-Anxiety & Depression
-Isolation
-Impaired mobility
-Financial worries
-Fear
-Sleep disturbances
-Mental health strain
-Chronic pain
-Limited independence

Opioids (Short-term):
Examples: Morphine, Hydromorphone, Oxycodone.
-Used for acute postoperative pain.
Non-Opioid Analgesics:
Acetaminophen or NSAIDs to reduce opioid use.
Anticoagulants:
Low Molecular Weight Heparin

-Prevents DVT/PE post-surgery.
Antibiotics:
Prophylactic Antibiotics:
Commonly administered pre- and post-operatively to prevent surgical site infections.
Bone Health Support:
Calcium and Vitamin D Supplements: Support bone healing and prevent osteoporosis.

Client/Family Education

List 3 potential teaching topics/areas

- Disease Education/Management
- Medication Management
- Weight/Exercise Management

NCLEX I *(1)*: Safe and Effective Care Environment

Multidisciplinary Team Involvement
(Which other disciplines do you expect to share in the care of this patient)

-Nurse
-PT
-OT
-Nutritionist
-Orthopedic doctor/ surgeon
-Anesthesiologist
-Social worker
-Case manager
-Rheumatologist
-Pain management
-PCP