

## Preconference Form

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Medical Diagnosis/Disease: Osteoarthritis & THA

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

#### Anatomy and Physiology Normal Structures

##### **Bones:**

Function of bone: support, protection (internal organs), voluntary movement, blood cell production, mineral storage. Serve as point of attachment for muscles and ligaments. Bones act as a lever for muscles to produce movement, ligaments provide stability. Bone marrow is responsible for making red & white blood cells. Bones serve as storage site for inorganic minerals like calcium & phosphorus.

Structure: dynamic tissue that continually changes its form & composition.

Classify bone: according to structure, compact and dense (cortical) or spongy (cancellous) Cortical bone cylindrical structure units called osteons fit closely together to create a dense bone structure within the systems the haversian canals run parallel to the bones. They contain the blood vessels that travel to the bones interior from the periosteum. Surrounding each osteon are concentric rings called lamellae which indicate mature bone. Spongy bones is filled with red or yellow marrow. Blood reaches the bone cells by passing through spaces in the marrow. bone cells: Osteoblasts make organic bone matrix which is collagen, they are basic bone forming cells. Osteocytes are mature bone cells. Osteoclasts take part in bone remodeling by helping breakdown bone tissue. bone remodeling is the removal of old bone by osteoclasts and the deposit of new bone by osteoblasts. The inner layer of bone is made mostly of osteoblasts with a few osteoclasts.

Types: long have central shaft (diaphysis), and 2 ends (epiphysis). Short bones composed of cancellous bones covered by a thin layer of compact bone (ex. Carpals and tarsals). Flat have 2 compact bones separated by a layer of cancellous bone (ex. Pelvis). Irregular have a variety of shapes and sizes (ex. Vertebrae)

Structure: the anatomical structure is represented by the long bone. Consists of Epiphysis: widened area at the end of long bones made out of cancellous bone, allows for weight distribution & joint stability, main location for muscle attachment, articular cartilage covers ends for smooth low friction joint movement). Diaphysis: main shaft of the bone, structural support. Made of cortical bone. Tubular structure allows it to withstand bending & twisting. Metaphysis: flared area between epiphysis & diaphysis, made of cancellous bone Epiphyseal plate: cartilaginous area between epiphysis & metaphysis. Formed in adults. Periosteum: fibrous connective tissue covering bone, blood vessels penetrate to bring nutrition to bone. Medullary cavity (marrow): in center of diaphysis, contains yellow or red bone marrow. (red in flat bones, yellow in long bones). Red is involved in blood cell production (hematopoiesis). Yellow composed of adipose tissue, storage of triglycerides also involved in hematopoiesis if needed.

##### Joints:

Joints are where the ends of 2 bones are in close relation to each other. They are classified by degree of movement. The most common is a freely moveable joint

#### Pathophysiology of Disease

Progressive noninflammatory disease of the diarthrodial (synovial) joints. It involves the gradual loss of articular cartilage with the formation of bone spurs or osteophytes in the joint margins, and cartilage destruction. It is not a normal part of the aging process. Damage at the level of the chondrocytes cause cartilage deterioration. The smooth white, translucent cartilage becomes dull, yellow, and granular as the disease progresses.

The cartilage becomes softer, less elastic, and less able to resist wear. The body cannot keep up with the cartilage repair. The collagen structure in the cartilage on the articular surfaces becomes worn & cracked. The central cartilage becomes thinner, and the joint edges become thicker & osteophytes form. The joint surfaces become uneven which effects the distribution across the joint causing reduced motion. Secondary synovitis can occur when the phagocytes try to get rid of the small pieces of town cartilage from the joint surface.

Early-stage: pain & stiffness with thickening and inflammation of the synovium & joint capsule.

Late-stage: increased pain & stiffness, uneven weight distribution causes bones to rub together.

Commonly affected joints include: hips (most common), knees, fingers, vertebrae, & toes.

It can cause deformity's such as Heberden's or Bouchard's nodes on the fingers. Or Varus (bowlegged), valgus knock-knee, or flexion deformity in the knees.

There is no known event or condition that directly correlates with cartilage damage or joint instability. The development of OA usually has many factors such as genetic

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

#### Anticipated Diagnostics

##### Labs

**CBC**

ESR

##### Additional Diagnostics

X-ray

Bone scan

CT

MRI

Synovial fluid analysis

called diarthrodial (synovial). Joints are enclosed in a capsule of fibrous connective tissue which joins the 2 bones together. The joint capsule is lined with a synovial membrane which secretes synovial fluid. The fluid lubricates the joints, reduces friction, & allows surfaces to slide over each other. It supplies oxygen and nutrients to & removes carbon dioxide & metabolic wastes from the chondrocytes within articular cartilage. The ends of the bones are covered in articular (hyaline) cartilage. Supporting structures such as ligaments & tendons reinforce the joint capsule & provide stability to the joint. The hip is a ball & socket joint (spheroidal) which is the joint that gives the greatest range of movement it allows for Flexion: decreasing/ narrowing the angle of a joint. Extension: increasing the angle of a joint (straightening the joint). Abduction: moving a body part away from the body. Adduction: moving a body part closer to the body. Circumduction: one end of an appendage remains relatively stationary and the other moves in a circle.

**Cartilage:**  
Hyaline cartilage is the most common type of cartilage & has a moderate amount for collagen fibers. It is found in synovial joints & supports soft tissue & provides articular surface for joint movement, as well as protecting underlying tissue. It lacks blood supply which is why it takes along time to heal & repair.

**Muscles:**  
Skeletal muscles move bones to produce movement. Skeletal muscles are composed of muscle cells & fibers. They can be further broken down into myofibrils, sarcomere (contractile unit), sarcolemma (cell membrane), sarcoplasm (cytoplasm), thick and thin filaments, motor unit (neuron & muscle cell activate it), neuromuscular junction. Muscles need neuronal stimulation for contraction. They use ATP to contract, they also need O<sub>2</sub> & glucose to generate power.

**Ligaments and Tendons:**  
Ligaments & tendons are composed of fibrous connective tissue with bundles of closely packed collagen fibers for strength. Tendons: attach muscle to bone as an extension of muscle sheath. Ligaments: connect bone to bone & provide stability while allowing movement of joints.

**Fascia:**  
Layer of connective tissue that separates muscles from other muscles & deliver support. There are two types superficial fascia: directly under skin, & deep fascia: dense fibrous connective tissue found between muscles.

**Bursae:**  
Small sacs of connective tissue lined w/ synovial membrane & contain synovial fluid. The trochanteric bursae is located on the greater trochanter proximal to the femur & skin.

**Hip Anatomy:**  
Femoral head: rounded head of femur that fits into the acetabulum & creates the ball part of the ball & socket joint.  
Acetabulum: socket or cup shaped structure in the hip bone that articulates with the head of the femur.  
Iliofemoral ligament: strongest ligament in the body, helps prevent overextension. Pubofemoral Ligament: reinforces the front of the hip & assists in preventing hyperextension. Ischiofemoral Ligament: found in the back of the hip joint, stabilizes joint during internal rotation & extension. Muscles of the hip include gluteus maximus, medius, & minimus, iliopsoas, adductors, IT band

traits, decreased estrogen, obesity, mechanical stress, and others.

**THA:**

Total hip arthroplasty is used to replace the hip joint (ball & socket) with a prosthesis. It is most common in treating OA, RA, and hip fractures. The prosthesis includes the cup (hip socket), ball (hip joint), & stem (part that's implanted in the femur). The goal of the surgery is to improve pain & function. There are two approaches anterior (incision at front of hip) & posterior (curved incision on side and back of hip).

**Postop:**

Postop care involves monitoring for bleeding and s/s of infection, neurovascular assessment, weight-bearing status, analgesics, frequent VS, incision site and dressing. There is a list of hip precautions the patient needs to follow for the first 4-6 weeks such as no hip flexion greater than 90 degrees, no hip adduction, no internally rotating hip, crossing legs, sit chairs with arms.

**Complications:**

- Infection
- Avascular necrosis
- Thromboembolism
- Risk for dislocation
- Neurovascular impairment

Contributing Risk Factors  
**Older age**  
 Women (menopause)  
**Obesity**  
 ACL injuries  
 Genetic & metabolic factors  
 Decreased mobility  
 Previous joint injuries  
 Repetitive movement of a certain joint  
 Family hx  
 Smoking

Signs and Symptoms  
**Joint pain**  
 Joint stiffness  
 Joint swelling  
 Crepitation  
 Loss of function  
**Impaired mobility**  
 Deformity

Possible Therapeutic Procedures  
Non-surgical  
 Arthrocentesis  
 Steroid injections  
 Gel injections  
Surgical  
 Joint replacements  
**Total hip arthroplasty (tha)**

Prevention of Complications  
 Deformity & disability  
 Heberden's & Bouchard's node  
 Varus (bowlegged), valgus knock-knee, or flexion deformity  
 Loss of function  
**Pain**

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

Anticipated Medication Management  
**Pain medication**  
 Intraarticular corticosteroids  
 Muscle relaxants  
 Anti inflammatory  
 Antibiotics (if postop)  
 Blood thinners  
 Disease-modifying osteoarthritis drugs  
 Topical relief gels

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

Non-Pharmacologic Care Measures  
 TENS  
 Therapeutic exercises  
**Heat/cold**  
**Assistive devices**  
**PT/OT**  
 Nutrition & weight management  
 Acupuncture

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

What stressors might a patient with this diagnosis be experiencing?  
**Effects on family dynamics**  
 Financial stress  
 Being overwhelmed  
 Job related stress/loss of job  
 Changes to routine  
 Pain  
**Worries about going to short-term or long-term care**

**Client/Family Education**

List 3 potential teaching topics/areas  
 • **Proper use of assistive devices such as a cane or walker**  
 • How to modify ADLs to improve quality of life & enhance function  
 • **Education on current medications (what they do, side effects, interactions, etc.)**

**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)  
 Orthopedics  
**PT/OT**  
**Orthopedic surgeon**  
**Case manager**  
 Nutritionist