OSTEOARTHRITIS (OA)

Erin Steele
steele1@otterbein.edu

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Osteoarthritis (OA)

Signs & Symptoms

- Pain: Affecting joints and acute pain during or after joint movements.
- Stiffness: Joint and muscle stiffness after periods of inactivity or upon awakening.
- Swelling: Soft tissue inflammation around joints.
- Synovitis: In advanced stages.
- Loss of Flexibility or Motion: Unable to move joints through full range of motion.
- Tenderness: Light pressure or tenderness near the inflamed area.
- Bone Spurs: Hard lumps can form around the joint and cause pain.

Grating Sensation: During joint movements may experience a popping or cracking sensation.

Underlying Pathophysiology

(Primary-idopathic vs. Secondary-trauma or mechanical misalignment)

- Multifactorial, not just a degenerative disease of cartilage
- Involves: Joint, bone, and ligament changes
- Cartilage is not vascularized or innervated, only will cause pain if damaged
- Bone: Loss of joint cartilage, synovium, subchondral bone, ligaments, periacicular muscles
- Synoviocytes: May secrete or have activity on synovial fluid
- Osteoarthritis: Synovial fluid inflammation

Significance of Pathophysiology

Understanding the underlying cause is key for preventing, slowing the progression, and developing the best treatment plan. Exercise has been proven to decrease pain and morbidity in OA patients. "Muscle around the affected joints becomes stronger, bone loss and joint swelling decrease, and stiffness and pain improve with a better lubrication of the cartilage" (Castrogiovanni, et al, 2019, P. 32).

OA Prevention-physical activity

(Rat studies suggest moderate physical activity is the key)

- Exercise: "Light pressure or tenderness near the inflamed area.
- Joint and muscle stiffness after periods of inactivity.
- Bone Spurs: Hard lumps can form around the joint and cause pain.
- Grating Sensation: During joint movements may experience a popping or cracking sensation.

Presentation of Case

A 60-year-old African American male presents to the office complaining of progressively worse dull/achy pain in his left knee that is worse after physical activity or at night. He has been diagnosed with OA and has a history of trauma and internal derangement. The knee joint is swollen and has a full range of motion.

Importance of Vitamin D

Vitamin D is essential for the development and maintenance of healthy bones. It plays a crucial role in regulating calcium and phosphorus metabolism, which is vital for bone health.

Vitamin D deficiency is common in individuals with OA, and supplementation has been shown to improve bone mineral density and reduce pain.

In the United States, 40% of adults have borderline or inadequate vitamin D levels. Low vitamin D levels are associated with increased OA risk.

References


Osteoarthritis: From Clinical Interventions to Cellular Pathophysiology.

References


Aerobic/endurance

Exercise modalities

Resistance/strength training

Balance/proproprioection

Streching

- This includes modalities such as Tai Chi, using slow and gentle movements to adopt different weight bearing postures while using breathing techniques.

Implications for Nursing Care

- Risk factors:
  - Age
  - Prior joint injury
  - Obesity
  - Genetics
  - Radies
  - African American

- Chief complaint: Pain
  - Early onset: "sharp"
  - Later stages: chronic " dull/achy"

- Neuroanatomy of knee joint
  - Sensory and sympathetic peripheral nerve fibers innervate
  - Sensory cell bodies located in the dorsal ganglion L3-L4

- Tissue injury/remodeling characteristics, molecules existing nociceptors:
  - Classic molecules: prostaglandins, bradykinins
  - Additional molecules: cytokines, chemokines

- Education
  - Vitamins: vitamin A, vitamin C, vitamin E
  - Phytochemicals from food

- Attributes found to decrease the inflammatory response, decreasing progression of OA
  - Antioxidants
  - Vitamins A
  - Vitamins C
  - Vitamins E
  - Phytoceramides
  - Polyphenols (support groups, psychologist, meditation, holistic medicine)

- Physiomechanics from food

30 million adults in the U.S. are affected by OA. Prevention, delay of progression and symptom management are multifaceted and require treatment in each individual. In general, maintaining a healthy diet, taking vitamins and low-impact regular exercise are big contributors to slowing the progression, decreasing the risk of OA.

There are many innovative treatment options available to manage OA in humans by interacting with TGF-beta, however more research studies are needed to optimize quality of life.