

OSTEOARTHRITIS/OSTEOARTHROSIS CONCEPTS

CVM 6420 Musculoskeletal Systems

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Osteoarthritis: [*osteo-* + Gr. *arthron* joint + *itis*] noninflammatory degenerative joint disease occurring chiefly in older persons, characterized by degeneration of the articular cartilage, hypertrophy of bone at the margins, and changes in the synovial membrane. It is accompanied by pain and stiffness, particularly after prolonged activity. Also called degenerative arthritis, hypertrophic arthritis, and degenerative joint disease.

--Dorland's Illustrated Medical Dictionary, 26th Edition

Concept #1: Osteoarthritis is a degenerative condition and, therefore, is most appropriately termed "osteoarthrosis".

Arthrosis vs. arthritis

- In most arthropathies (arthroses), the initial disease process is not centered in the interstitium and capillary bed of the synovium and is not being driven from its outset by mediators of inflammation
- Joint fluid is initially normal, and the joint disease is not related to a systemic or local soft tissue disease process
- In inflammatory arthritis (e.g. rheumatoid arthritis or infectious arthritis), the opposite is true.

Outcome of osteoarthrosis

- Chronicity leads to progressive deterioration of joint surfaces and accumulation of degenerative matrix elements and chondrocyte breakdown products within the joint cavity
- Joint debris entrapped in the synovium has the capacity to provoke a low-grade synovitis so that synovial inflammation is the result, rather than the initiator, of the structural changes in the joint.

In the end stage, the differentiation between a primary inflammatory disease and degenerative joint disease may be impossible.

Concept #2: Osteoarthrosis involves all of the joint structures; lesions are not confined to articular cartilage.

- Articular cartilage degeneration/fibrillation/loss
- Subchondral bone thickening
- Osteophyte formation
- Synovial membrane proliferation
- Low-grade synovitis

Concept #3: Osteoarthritis is common in humans and in domestic animals.

- Most common cause of disability in humans.
 - Degenerative changes occurring with age in humans are so common that they often are considered to be normal.
 - When these progress rapidly and reach a degree that results in pain and locomotor disturbances, they are considered pathological.
 - Pain appears to be related to the involvement of the synovial membrane and subchondral bone.

- With the possible exceptions of sheep and cats, osteoarthritis is also common in domestic animals
 - Joints affected are species dependent.

Concept #4: Osteoarthritis may be primary or secondary

- Primary osteoarthritis is idiopathic
 - Most common type of osteoarthritis occurring in humans
 - Major risk factors in humans include aging, genetic predisposition, and obesity
 - Estrogen deficiency appears to be a factor in postmenopausal women
 - Joints affected most commonly are the hip, knee, and interphalangeal joints.

- Examples of primary osteoarthritis in animals:
 - “ringbone”
 - Degenerative arthropathy of the interphalangeal joints of ungulates, especially horses
 - Occurs mainly in the forelimbs
 - Thought to be secondary to minor, repeated mechanical stress

 - “spavin”
 - Arthropathy of the tarsus in the horse and occasionally the ox

 - Arthropathy of the canine shoulder joint
 - Occurs commonly in middle-aged and old dogs
 - As many as 80% of animals more than 8 years of age are affected
 - Lesions are bilateral and develop slowly

 - Arthropathy of the bovine stifle
 - Dairy cows
 - Bilateral
 - Lesions are most severe in the medial joint compartment

Secondary osteoarthritis

- May result from any insult that produces structural injury to joint cartilage or subchondral bone or that is associated with prolonged or repetitive abnormal joint function.
- Examples include trauma and developmental abnormalities, particularly osteochondrosis

Concept #5: Mature articular cartilage has an extremely low potential for effective repair.

- The cartilage covering the ends of growing long bones is composed of an overlying avascular articular cartilage zone and a subjacent, vascularized epiphyseal cartilage zone
- Growth cartilage has excellent potential for repair
- Adult articular cartilage is avascular and has an extremely low potential for repair
- Repair tissue replacing adult articular cartilage is composed of fibrocartilage.

Concept # 6: Articular cartilage is under constant mechanical stresses, another important factor influencing repair.

Concept #7: Clinically, osteoarthritis is manifested as pain and lameness; medical therapies are few.

- Analgesics
- Chondroitin sulfate/glucosamine

Concept #9: At the present time, clinical diagnosis of osteoarthritis is only possible in the chronic stages of the disease.

- Currently, the only effective therapy is surgical
- In the future, refined magnetic imaging techniques and/or synovial fluid markers may allow detection of subclinical disease and effective medical therapies may be developed.