

# **OSTEOARTHRITIS**

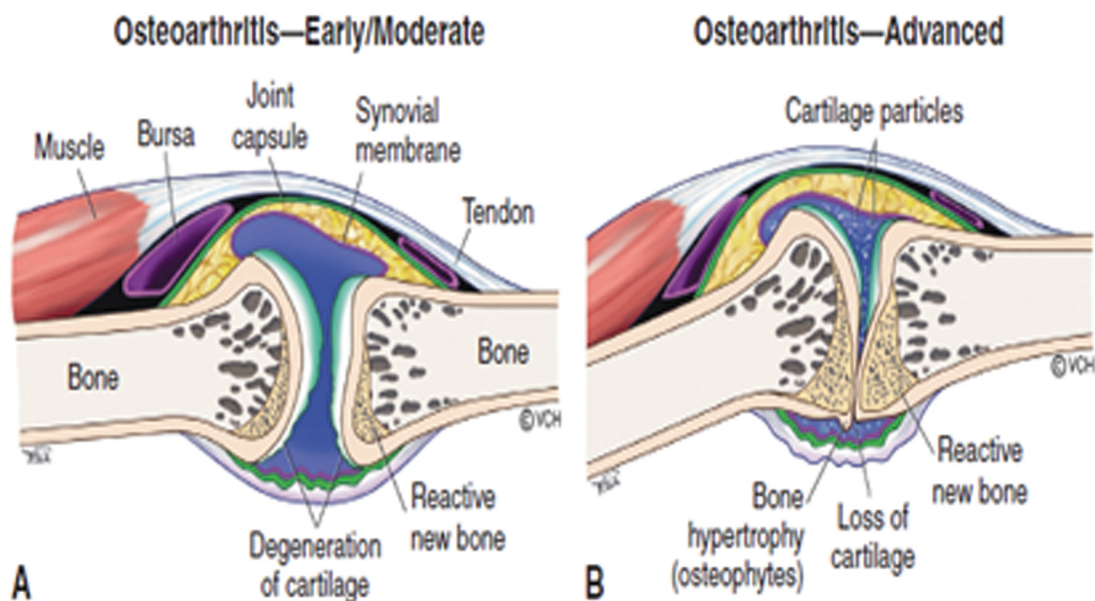
collected by : Sarah Al-Malki

Designed by : Ruqaya Turabi

# OSTEOARTHRITIS

Osteoarthritis (OA) is primarily confined to one or more synovial joints and its surrounding soft tissues

**Two predominant, pathological features once defined OA**  
-the progressive destruction of articular cartilage and the formation of bone at the margins of the joint  
-OA is now recognized as a disease involving the entire joint including the periarticular musculature



-Accordingly, the impairment, activity limitations, and participation restrictions related to OA extend far beyond the perimeters of the synovial joint  
-Data on the personal and societal impact of OA increasingly demonstrate its importance as an individual and public health issue

# ETIOLOGY

No single factor that predisposes an individual to OA has been identified, Although aging is indeed strongly associated with OA. it must be emphasized that aging in itself does not cause OA nor should OA be considered synonymous with the “normal” aging process

Several factors related to aging may contribute to its development

**Genetic factors** account for between 39% and 65% of radiographic OA of the hand, hip, and knee in women and as much as 70% of OA cases of the spine

**Trauma before adulthood** may initiate a remodeling of bone that alters joint mechanics and nutrition in a way that becomes problematic only later in life. The role of repetitive micro-trauma in the etiology of OA has also received attention

Specifically, **occupational tasks** involving heavy lifting are associated with the development of hip OA, and those involving kneeling and heavy lifting are related to development of knee OA

**Malalignment**, including varus and valgus deformities, and leg length discrepancy are associated with greater prevalence of knee and hip OA, respectively

The strongest predictor of disease progression in the knee is varus malalignment. At the hip, there is increasing recognition of the role of femoroacetabular impingement (FAI) (a mechanical mismatch between the femoral head and acetabulum) in development of OA

**The relationship between obesity and incidence of OA** is stronger in women than in men



# Risk factors for Osteoarthritis

<b>Systematic factors</b>	<b>Local factors</b>
Age	Obesity
Gender	Major joint trauma (e.g. ACL rupture)
Race	Repetitive Stress (Occupation)
Genetic	Muscle Weakness
Metabolic endocrine/ High bone density	Altered joint biomechanical Joint malalignment
Nutritional Status (e.g. Vitamin D)	Proprioceptive impairments
Congenital developmental/ Obesity	



## **DISEASE ONSET AND COURSE**

OA typically starts in an insidious fashion and may progress undetected in some individuals when early, aneural articular cartilage is the only involved tissue

Pain is initially episodic and triggered by specific activity. In later disease, pain becomes a chronic, dull ache accentuated with episodic severe pain. It is pain that leads an individual to seek medical help. Unlike RA, there are no systemic features such as fatigue, fever, or malaise with the onset of OA

OA is typically a slowly progressive condition; however, most people with radiographic evidence of joint damage in their hips or knees stabilize and do not require joint replacement surgery

## **CLASSIFICATION AND DIAGNOSTIC CRITERIA**

Most researchers have used Kellgren and Lawrence's grade 2 definition (the presence of definite osteophytes), and a few others have required evidence of joint space narrowing (grade 3 corresponding to clinically identified disease) to designate OA

Although radiographic evidence of joint space narrowing and osteophytes may help confirm the diagnosis and classify the stage of OA, the clinical criteria for hip, knee, and hand OA are described primarily in terms of pain and limitation of motion

OA is typically differentiated in two ways : primary "idiopathic secondary disease . When the etiology of the disease is unknown with no known prior event, it is termed primary or idiopathic OA. This category can be further divided into localized (one or two joints affected) or generalized OA affecting three or more joints

Generalized OA typically involves the hands in a more symmetrical fashion not unlike inflammatory forms of arthritis and has a stronger genetic association OA is classified as secondary when the etiology (e.g., trauma biomechanical factors congenital malformation, or other musculoskeletal disease) can be identified

# Clinical Classification Criteria for Knee, Hip, and Hand Osteoarthritis

## Hip Osteoarthritis

**Pain present in combination with either :**

Hip internal rotation  $\geq 15^\circ$   
morning stiffness  $\leq 60$  min

Hip internal rotation  $< 15^\circ$   
and hip flexion  $< 115$

## Knee Osteoarthritis

Persistent knee pain

Limited morning stiffness  $\leq 30$  minutes

Reduced function

Crepitus

Bony enlargement

Restricted movement

## Hand Osteoarthritis

Presence of Heberden's nodes

Age more than 40 years

Family history of nodes

Joint space narrowing in any finger joint



## **DISEASE ONSET AND COURSE**

the clinical diagnosis is often made on the basis of signs and symptoms (e.g., pain and swelling, loss of ROM, and bony deformity).

\* Not all joints are equally affected by OA. In the upper extremity , the finger DIP and PIP joints and CMC of the thumb are commonly involved. The cervical and lumbar spine, hips, knees, and MTP of the great toe are also sites for OA. The MCP joints, wrists, elbows, and shoulders are usually spared in primary OA.

Unlike RA, OA does not have a bilateral, symmetrical presentation (with the exception of generalized OA).

Individuals with OA may experience some stiffness in particular joints on awakening that is similar to the stiffness felt when moving the same joints after inactivity during the day, but this stiffness (articular gelling) typically does not last more than 30 minutes, nor is it generalized to the entire body.



## CREPITUS

Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book.

## CARTILAGE DEGENERATION

is the primary manifestation of OA, cartilage is aneural, and therefore not the cause of a person's pain.



Pain in OA can arise from any innervated tissue and may be attributed to incongruent articulations of joint surfaces, periosteal elevation secondary to bone proliferation at the joint margin (osteophytes), vasocongestion in subchondral bone, trabecular microfractures, distention of the joint capsule, and muscle spasm or strain



## SECONDARY SYNOVITIS AND EFFUSION

- Many patients will also experience a secondary synovitis and effusion, especially when the knee is involved.

symptoms do not always match the severity of the disease on radiographs. Further, some patients with OA may have an amplified pain experience and central pain sensitization at the spinal or cortical level. Unlike individuals with RA who often report more pain and stiffness at rest, the pain associated with OA is likely to occur or worsen with motion, except in the later stages of the disease when it is present at rest and with activity

# JOINTS

## Hands and Fingers



In the hand, DIP and PIP involvement may result in reduced ROM, poor grip strength, bony nodes, and joint angulation as a result of stretched collateral ligaments or bone erosion.

Bouchard's nodes at the PIP joints and Heberden's nodes at the DIP joints are often tender in the early stages and can lead to marked restrictions in finger ROM and fine motor skills later in the disease.

Osteoarthritic damage in the first CMC joint results in pain or aching at the base of the thumb and can lead to decreased pinch strength and squaring of the thumb (thickening and prominence of CMC due to subluxation of first metacarpal) as a result of weakness and contracture of the thenar muscles. This in turn affects abduction, extension, and opposition ROM of the thumb and greatly affects grip strength and hand function.



# JOINTS

## hip joint



### Symptoms of hip OA are usually

- \*insidious in onset and may include a limp.
- \*decreased ROM with a tendency for the hip to be held in a somewhat flexed, abducted, and externally rotated position.
- \*Internal rotation is usually restricted and painful

-Pain arising from the hip joint is commonly experienced in the groin, but can also be felt in the buttock, trochanteric or knee

-Decreased hip ROM is associated with decreased walking speed, decreased stride length, poor balance, and increased energy expenditure

-Hip OA is also associated with increased risk of falls

# JOINTS

## Knee joint



### Symptoms of knee OA :

Early presentation of knee OA includes pain with weight-bearing activities such as climbing stairs and squatting. In later stages, both pain and stiffness are reported after prolonged sitting.

- locking and buckling (giving way), may also occur with damage to stabilizing menisci and ligaments and lead to increased risk of falls
- commonly affects the medial joint due to the higher weight bearing load placed on this compartment
- As a result, medial joint space narrowing often results in pseudolaxity of the medial collateral ligament, stretching of the lateral collateral counterpart, and a genu varus deformity
- A flexion deformity of several degrees can develop quickly in the painful knee and contribute to a functional leg length discrepancy
- decreased step length, and quadriceps muscular fatigue or strain
- Patellofemoral compartment OA, with its hallmark anterior knee pain can occur in isolation as a result of patella malalignment abnormal tracking and loading, and direct trauma to the patella

# JOINTS



## Feet and Toes

The first MTP joint is the most common site of OA affecting the foot and may result in hallux rigidus or hallux valgus deformities

- Changes in the other MTP joints and toes as a result of OA and resultant shortening of the long extensors can lead to hammer toes
- Forefoot involvement contributes to poor push-off in the terminal stance phase of gait and balance issues



# JOINTS

## Spine

The lower cervical and mid to lower lumbar regions of the spine are most susceptible to OA

-The facet (zygapophyseal) joints are the only true synovial joints in the spine. Facet joint osteophytes can contribute to lateral and central lumbar stenosis and subsequent nerve root impingement

Pain from facet joint OA can originate

-from the joint itself and affected nerve roots (radicular pain) and in the lumbar area, and typically increases with:

\*spinal extension, rotary motions, and when standing or sitting

\*Lying and spinal flexion lead to pain relief

# PROGNOSIS

OA is a slow progressing disease that can be self-limiting or progress to advanced joint and soft tissue damage leading to complete failure of that joint

## REFERENCES

1. Felson, DT: Developments in the clinical understanding of osteoarthritis. *Arthritis Res Ther* 11:203, 2009. Retrieved May 15, 2011.
2. O'Sullivan SB, Schmitz TJ, Fulk GB, Physical Rehabilitation. Sixth edition, Philadelphia, FA Davis Company; 2014.
3. Garstang, SV, and Stitik, TP: Osteoarthritis: Epidemiology, risk factors, and pathophysiology. *Am J Phys Med Rehabil* 85(11):S2, 2006.
4. Jensen, L: Hip osteoarthritis: Influence of work with heavy lifting, climbing stairs or ladders, or combining kneeling/squatting with heavy lifting. *Occup Environ Med* 65:6, 2008.
5. Altman, RD: Early management of osteoarthritis. *Am J Manage Care* 16:S41, 2010.