

Osteoarthritis

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Plan of the Lecture

- Definition
 - Epidemiology
 - Risk factors
 - Etiology
 - Mechanisms
 - Classification
 - Clinical investigation
 - Diagnosis
 - Treatment
 - Prognosis
 - Prophylaxis
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- Diagnostic and treatment guidelines

Definition:

It is a **chronic disorder** of synovial joints in which there is **progressive softening** and **disintegration of articular cartilage** accompanied by **new growth of cartilage and bone** at the **joint margins** (osteophytes), cyst formation, sclerosis in the subchondral bones.

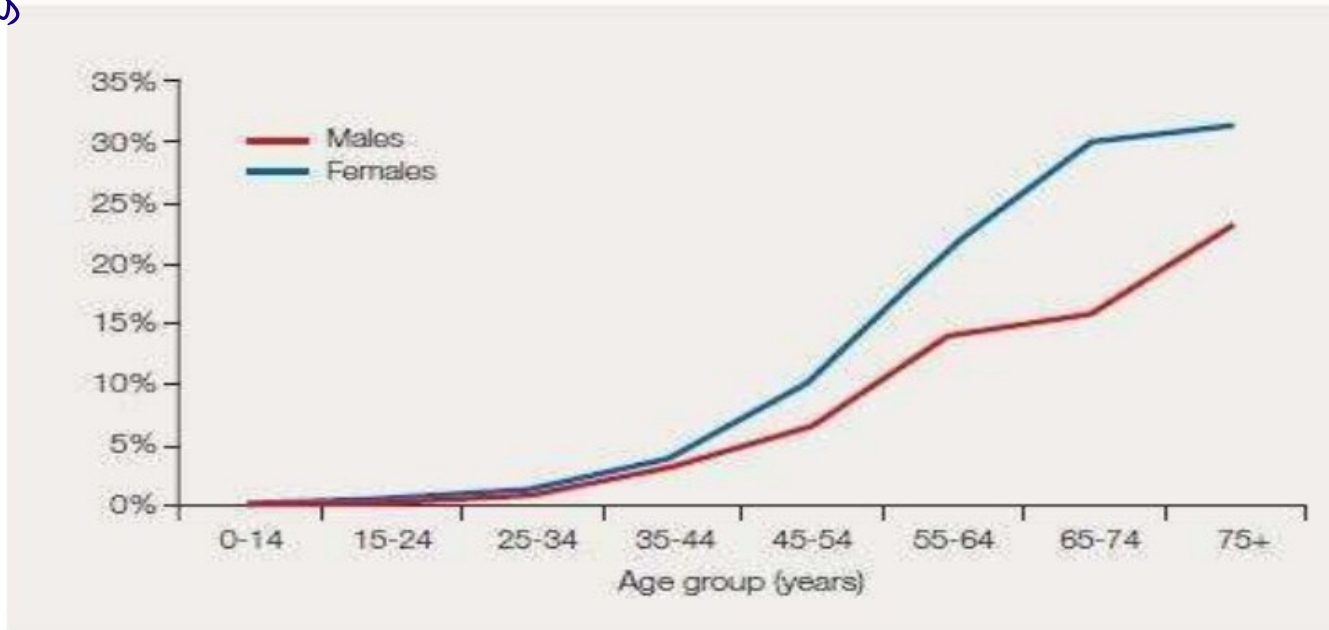
Epidemiology

- Internationally, osteoarthritis is the most common articular disease.
- On the basis of the radiographic criteria for osteoarthritis, more 50% of adults older than 65 years are affected by the disease.
- In individuals older than 55 years, the prevalence of osteoarthritis is higher among women than among men.
- Symptomatic knee osteoarthritis is extremely common in China.
- It is the leading cause of chronic disability in those older than 70 years, costing the US greater than \$100 billion annually.

Epidemiology

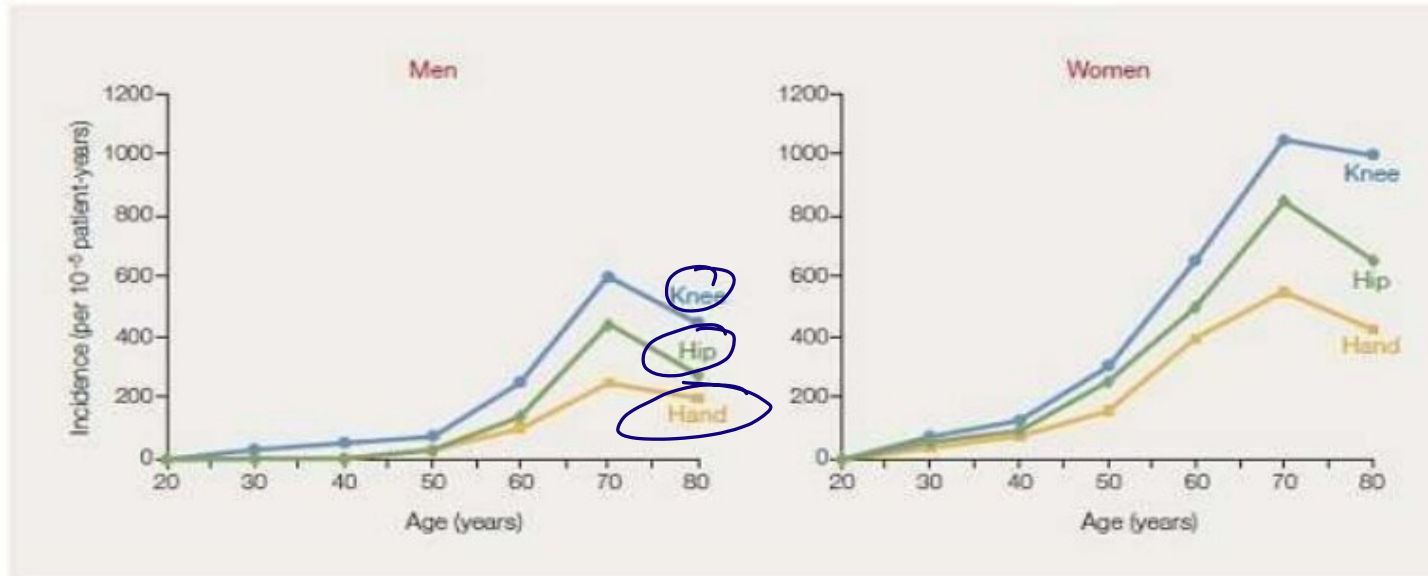
(Age-specific prevalence of osteoarthritis)

more in females



Epidemiology

(Incidence of Clinical Osteoarthritis of the Hand, Knee, and Hip)



Risk Factors

- AGE: symptomatic OA rise steeply after age 50 in men and age 40 in women.
- Sex: women are more likely to report pain in all affected joints, including the hip, than men.
- Obesity and metabolic disease.
- Local mechanical risk factors: a traumatic knee injury.
- Ethnicity and race: hip and hand OA are much less frequent among Chinese.
- Genetics: OA associated with a particular genetic syndrome, such as stickler syndrome or familial chondrocalcinosis.
- Nutrition (including vitamin D).
- Osteoporosis.
- Sarcopenia.
- Smoking.

Etiology

(Primary and Secondary)

- Primary (in the absence of an extrinsic cause).
- Secondary:
 - Chondrocalcinosis,
 - Posttraumatic,
 - Metabolic bone disorders,
 - Hypermobility syndromes,
 - Neuropathic diseases,
 - Marfan syndrome
 - Obesity
 - Joint infection

Prevalence

- Primary Osteoarthritis (OA) is the most common type of arthritis.
- The prevalence of OA correlates strongly with age.
- Regardless of how it is defined, **OA is uncommon in adults under age 40 and highly prevalent in those over age 60.**
- Men and women **are equally** likely to develop OA, But more common in older women i.e. above 50 yrs, particularly in postmenopausal age.

- ❑ OA affects certain joints, yet spares others.
- ❑ Commonly affected joints are:
 - ❑ **1- knee (most common)**
 - ❑ **2-hip**
 - ❑ 3-cervical
 - ❑ 4-lumbosacral spine
 - ❑ 5- and first metatarsal phalangeal joint (MTP).
 - ❑ 6- the distal and proximal interphalangeal joints and the base of the thumb are often affected.



BOX 5.1 MAJOR RISK FACTORS FOR OA

Systemic predisposition

- Genetics
- Age
- Gender
- Diet and obesity

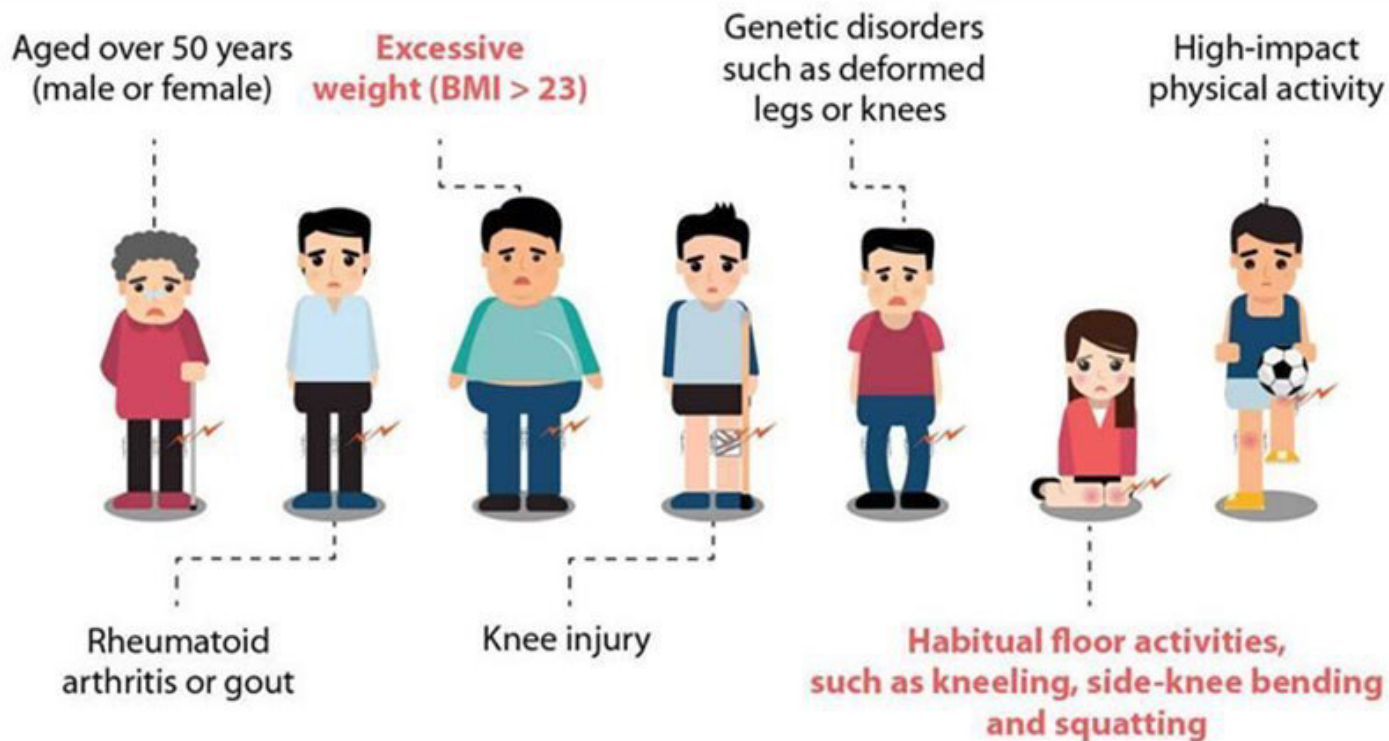
Local biomechanical factors

- Abnormal joint shape and size
- Previous injury
- Neuromuscular problems
- Obesity
- Loading/occupational factors

Bone mineral density

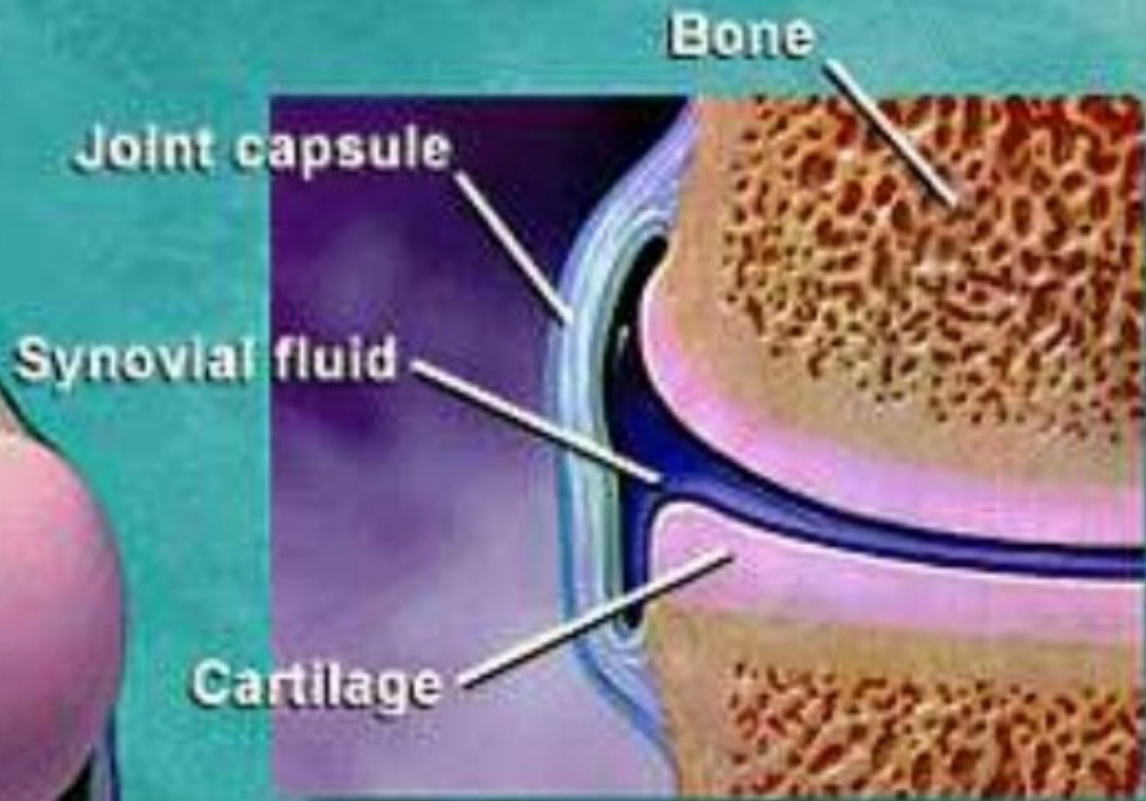
(It is unclear whether this is a local or a systemic factor)

7 risk factors of knee osteoarthritis



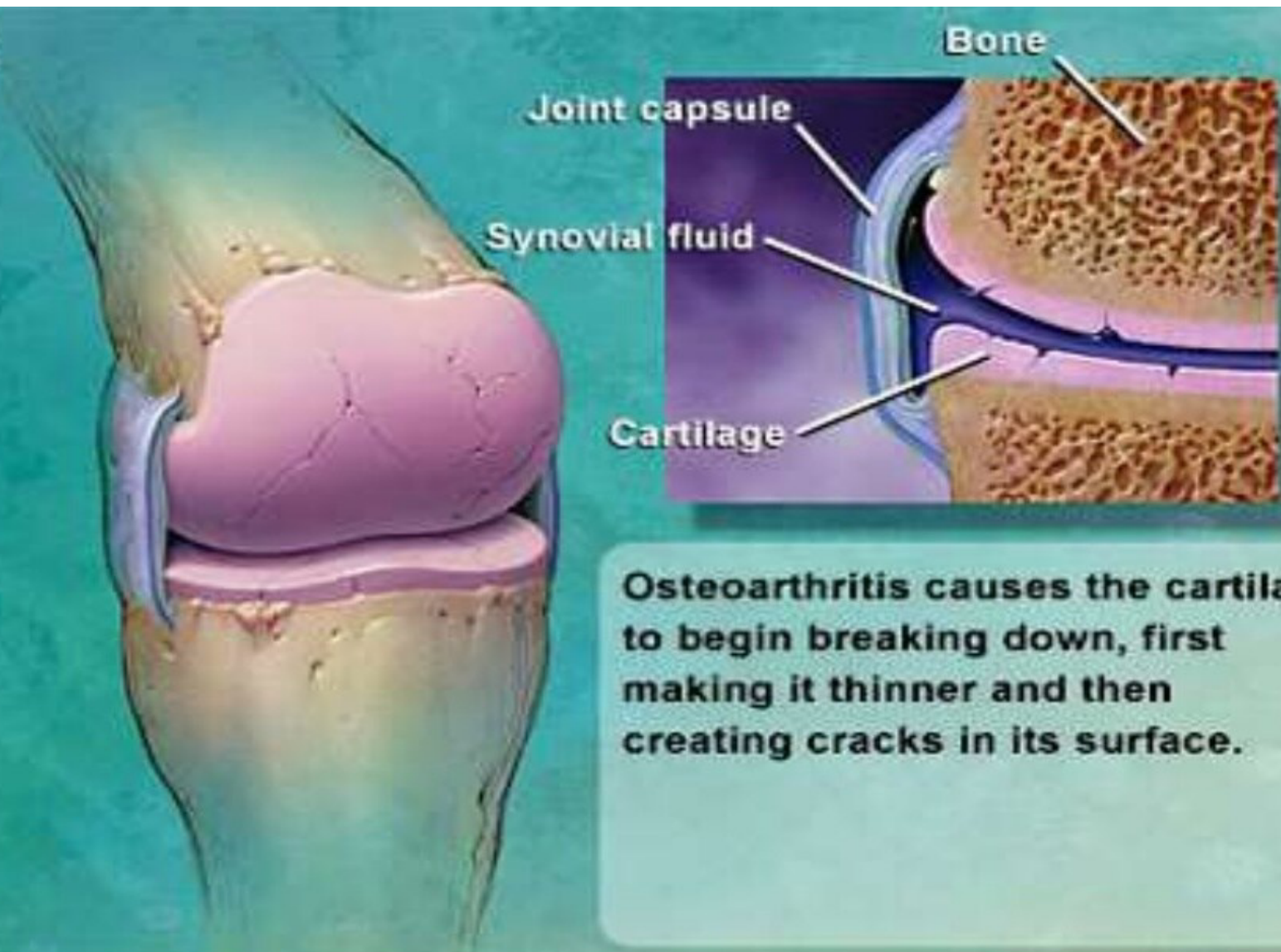
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.Path physiology.



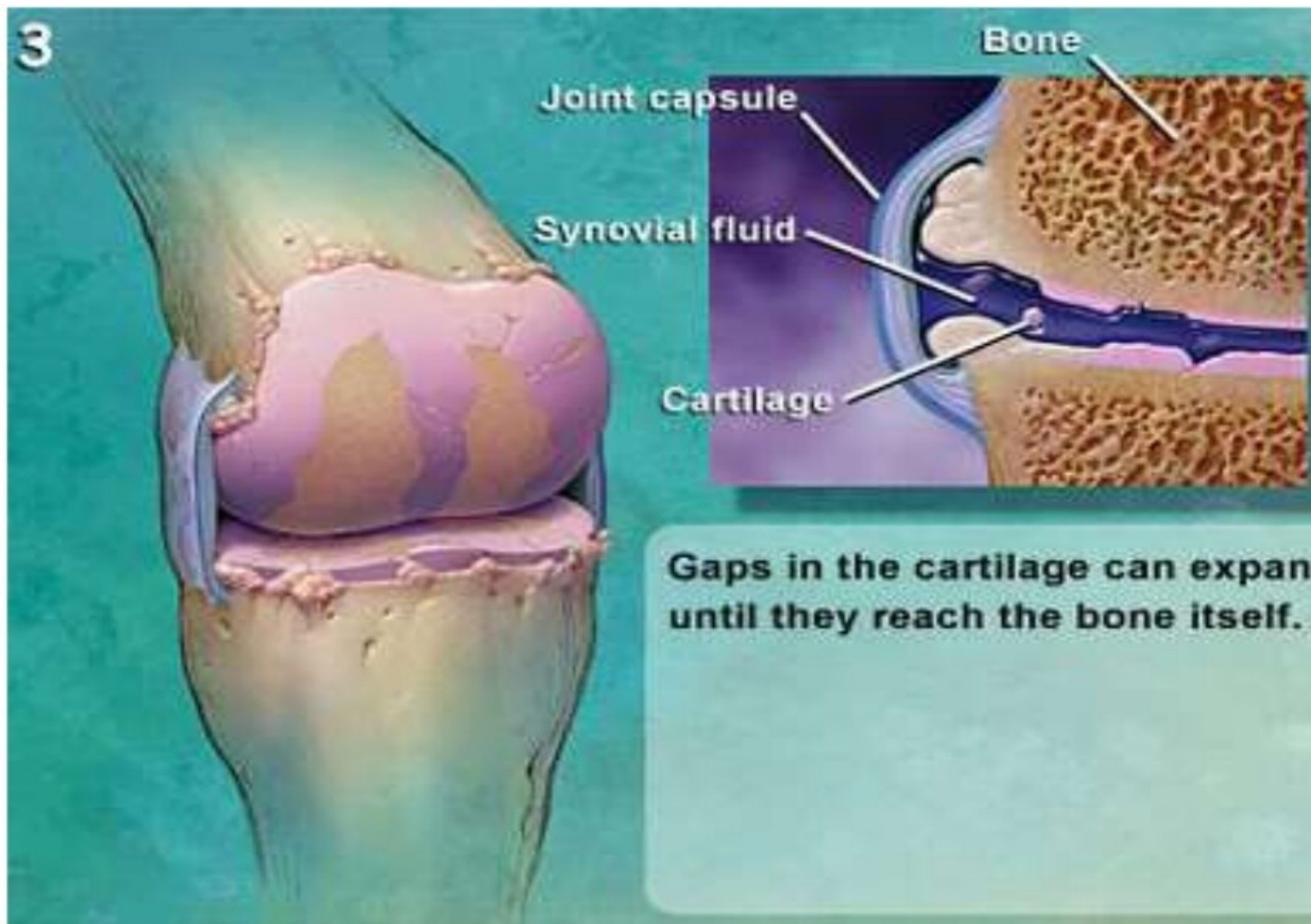
In a normal joint, healthy cartilage, lubricated by synovial fluid, cushions the bones and allows

2



Osteoarthritis causes the cartilage to begin breaking down, first making it thinner and then creating cracks in its surface.

3



Gaps in the cartilage can expand until they reach the bone itself.

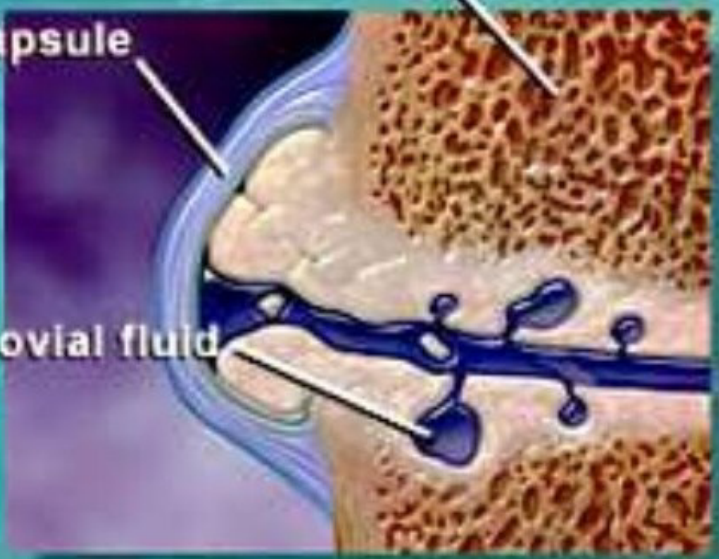
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Joint capsule

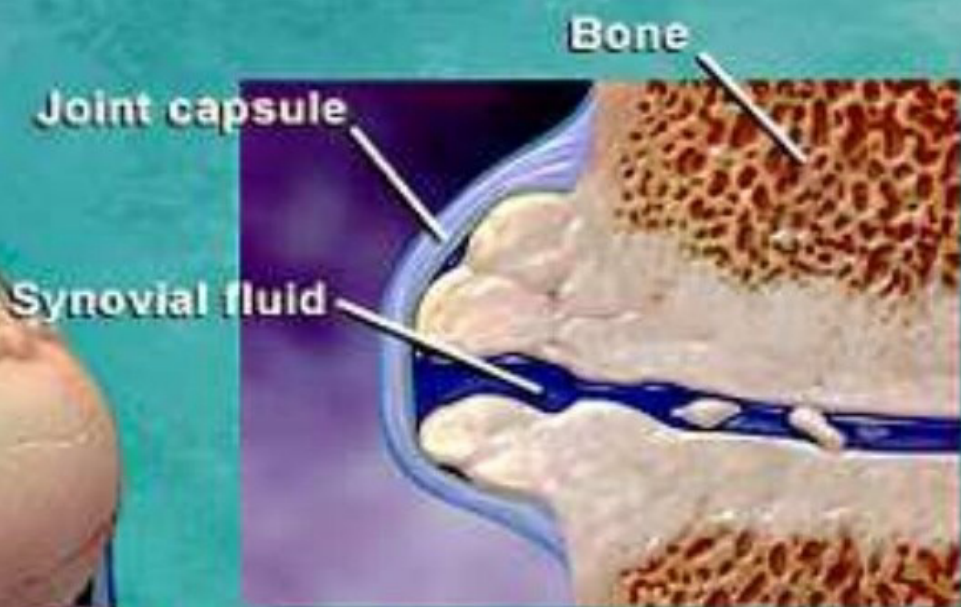
Bone

Synovial fluid

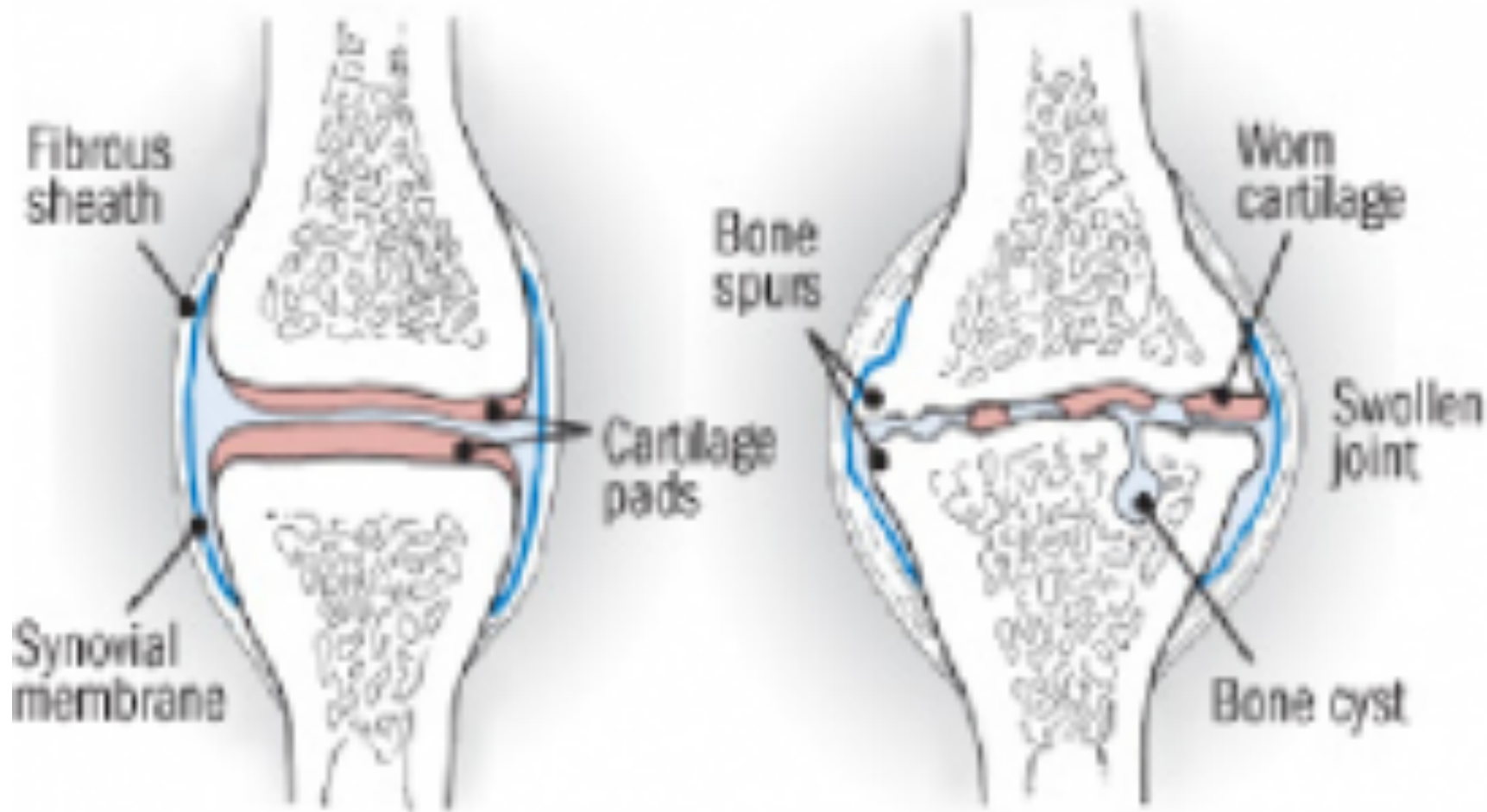


Synovial fluid leaks into cracks which can form in the bone's surface when this replacement cartilage wears away. This causes further damage and in some cases can lead to cysts in the bone or other deformities.

5



If not treated, damage can progress to the point where the bones in the joint become seriously and permanently deformed.



Subchondral bone exposure, sclerosis, osteophytes.

Classification of OA

- **Primary versus Secondary OA.** *whether or not there is an obvious cause.*
- **Asymptomatic versus symptomatic.** *symptoms are associated with joint damage or not.*
- **Localized versus Generalized OA.** *extent and pattern of joint involvement.*
- **Hypertrophic versus Atrophic OA.** *type of bone reaction.*
- **Progressive versus Inactive OA).** *whether the disease process is active, resulting in progression, or not.*

Clinical Investigation

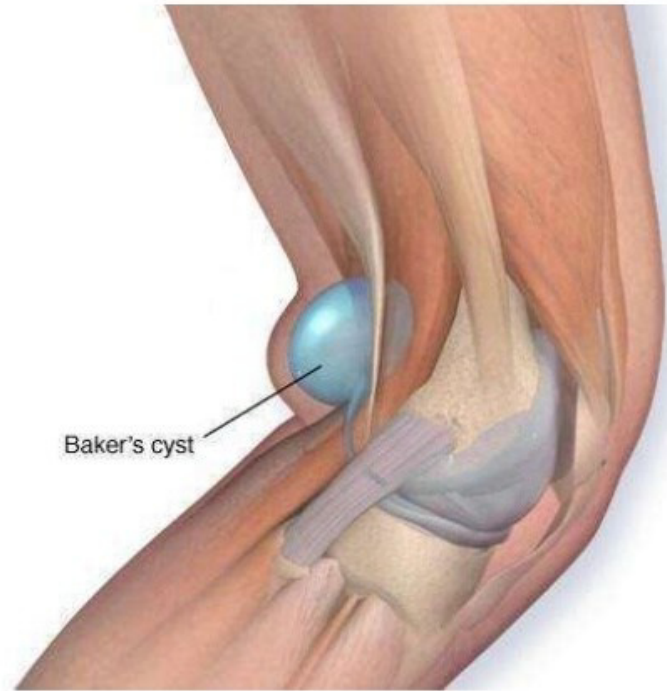
(Signs and Symptoms)

- Symptoms vary, depending on which joints are affected and how severely they are affected.
- Reduced range of motion and crepitus (frequently present).
- Stiffness during rest (gelling), may develop, with morning joint stiffness usually lasting for less than 30 minutes.
- Clicking or cracking sound when a joint bends.
- Mild swelling around a joint.
- Pain that is worse after activity or toward the end of the day (the disease's primary symptom).
- Decreased function, muscle weakness and impaired balance with increased risk of falls and fractures.
- Narcotic pain relievers can cause patient to feel dizzy and unbalanced.

Clinical Investigation

(Signs and Symptoms: Knee)

- Pain on range of motion.
- Joint effusion
- Crepitus on range of motion
- Presence of popliteal cyst (Baker cyst)
- Lateral instability
- Valgus or varus deformity



Clinical Investigation

(Signs and Symptoms: Hip)

- Pain on range of motion.
- Pain in buttock
- Limitation of range of motion, especially internal rotation



Clinical Investigation

(Signs and Symptoms: Foot)

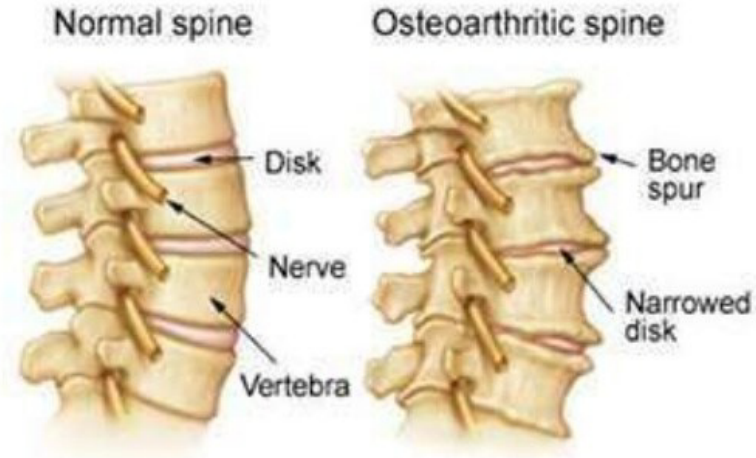
- Pain on ambulation, especially at first metatarsophalangeal joint.
- Limited range of motion of first metatarsophalangeal joint, **hallux rigidus**.
- **Hallux valgus** deformity.



Clinical Investigation

(Signs and Symptoms: Spine)

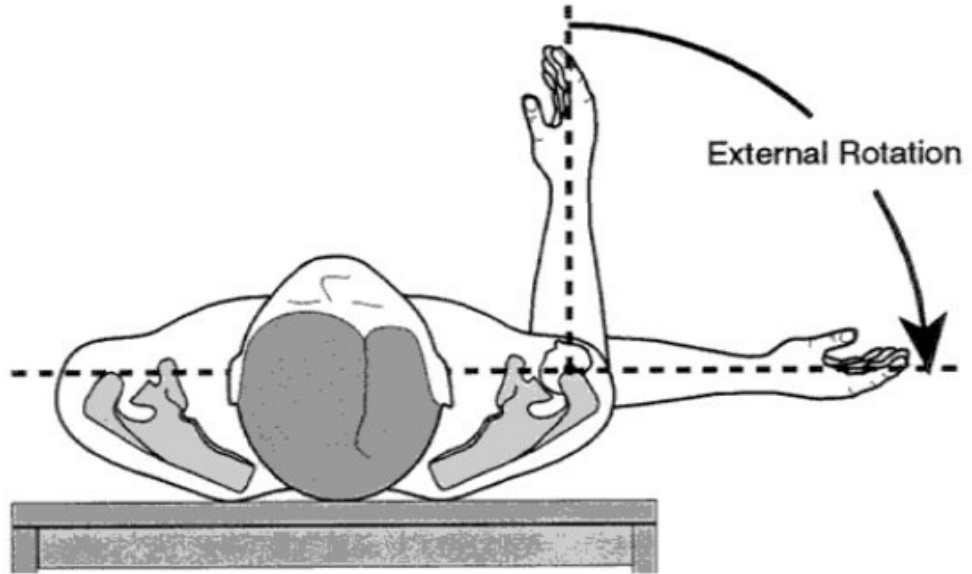
- Pain on range of motion.
- Limitation of range of motion.
- Lower extremity sensory loss, reflex loss, motor weakness caused by nerve root impingement.
- **Pseudoclaudication** caused by spinal stenosis.



Clinical Investigation

(Signs and Symptoms: Shoulder)

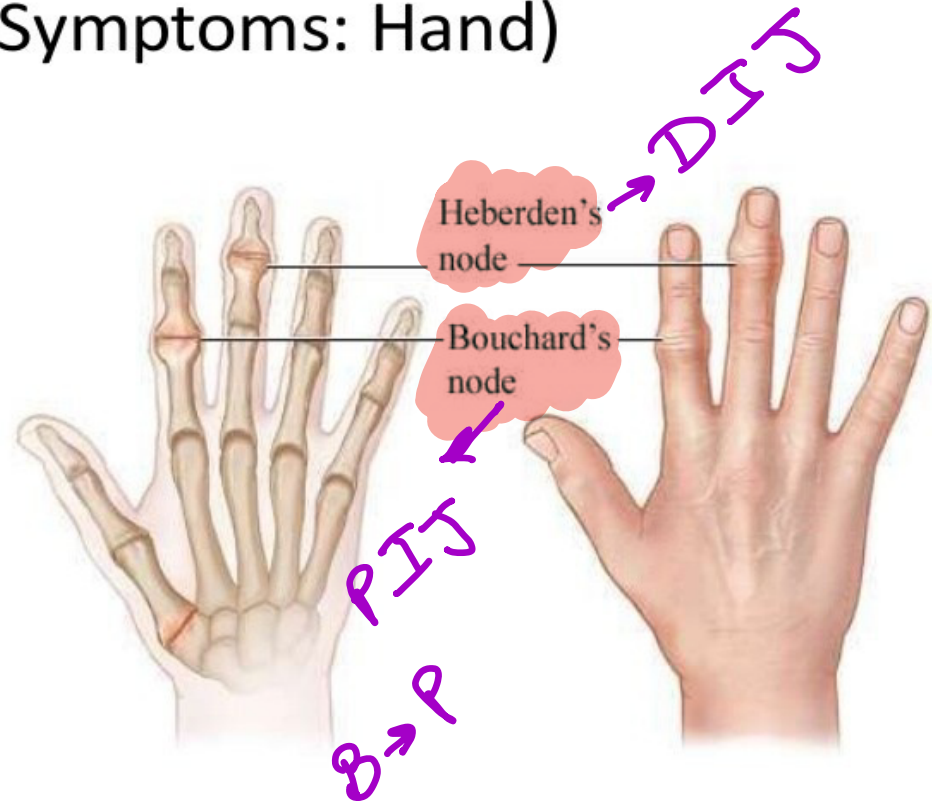
- Pain on range of motion.
- Limitation of range of motion, especially external rotation.
- Crepitus on range of motion



Clinical Investigation

(Signs and Symptoms: Hand)

- Pain on range of motion.
- Hypertrophic changes at distal and proximal interphalangeal joints (Heberden nodes and Bouchard nodes).
- Tenderness over carpometacarpal joint of thumb.



Baker's Cyst pathophysiology

- **presence of a connection between the knee joint and a bursa between the gastrocnemius muscle and the semitendinosus tendon, allowing the flow of fluid.**

Diagnosis

- Osteoarthritis is typically diagnosed on the basis of clinical and radiographic evidence.
- No specific laboratory abnormalities are associated with osteoarthritis.
- Imaging studies include plain radiography, computed tomography (CT).
- Arthrocentesis: the presence of **noninflammatory joint fluid** helps distinguish osteoarthritis from other causes of joint pain.

Diagnosis

(Radiograph of the Hand)

PIS → *Bouchard*
DIT → *Heberden*



The hand affected by osteoarthritis: (1) joint space narrowing, (2) osteophytes, and (3) joint destruction. Changes at carpometacarpal joint (4), which are very common in osteoarthritis.

Diagnosis

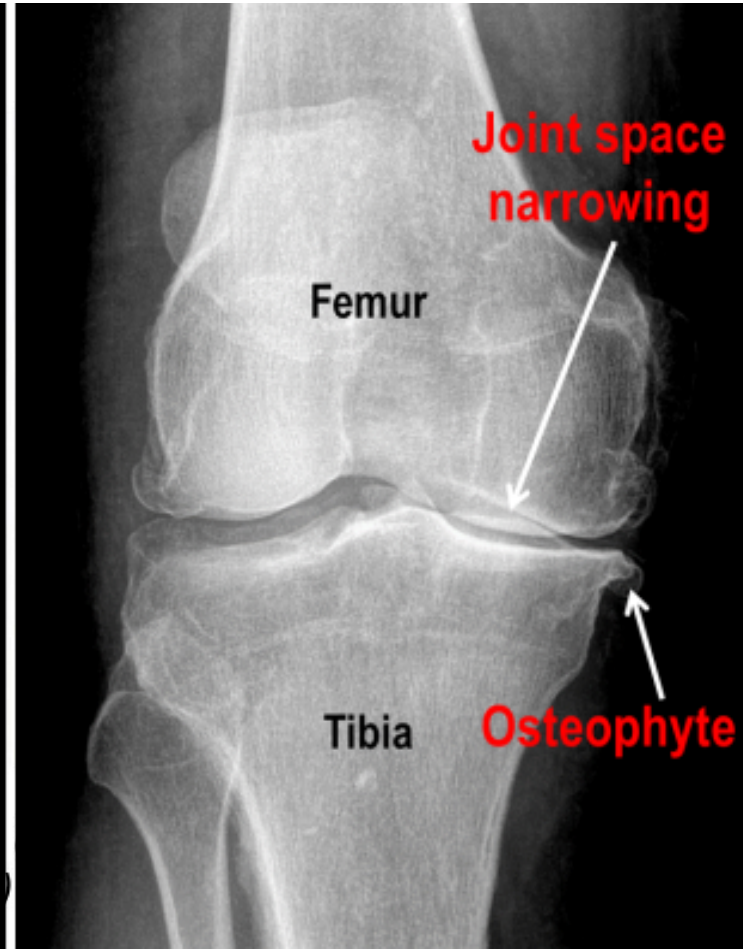
(Radiograph the Hips)



The hips: (1) joint space narrowing and (2) osteophyte formation.

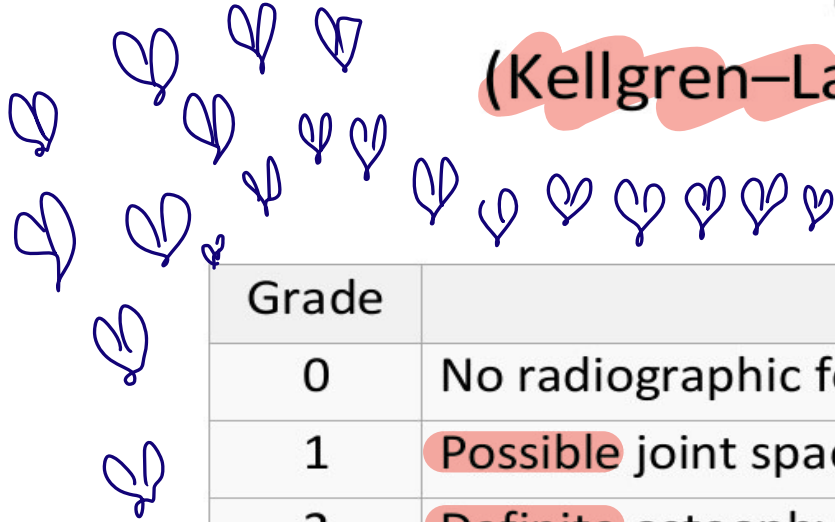
Diagnosis

(Radiograph the Knee)



Diagnosis

(Kellgren–Lawrence Grading Scale)



Grade	Description
0	No radiographic features of osteoarthritis.
1	Possible joint space narrowing and osteophyte formation.
2	Definite osteophyte formation with possible joint space narrowing.
3	Multiple osteophytes, definite joint space narrowing, sclerosis and possible bony deformity .
4	Large osteophytes , marked joint space narrowing , severe sclerosis and definite bony deformity .

Treatment

(Nonpharmacologic Recommendations)

- Cardiovascular and/or resistance land based exercise.
- Aquatic exercise.
- Lose weight (for persons who are overweight).
- Participate in self-management programs.
- Manual therapy in combination with supervised exercise.
- Psychosocial interventions.
- Be instructed in the use of thermal agents.
- Balance exercises, either alone or in combination with strengthening exercises.
- Tai chi.
- Manual therapy alone.

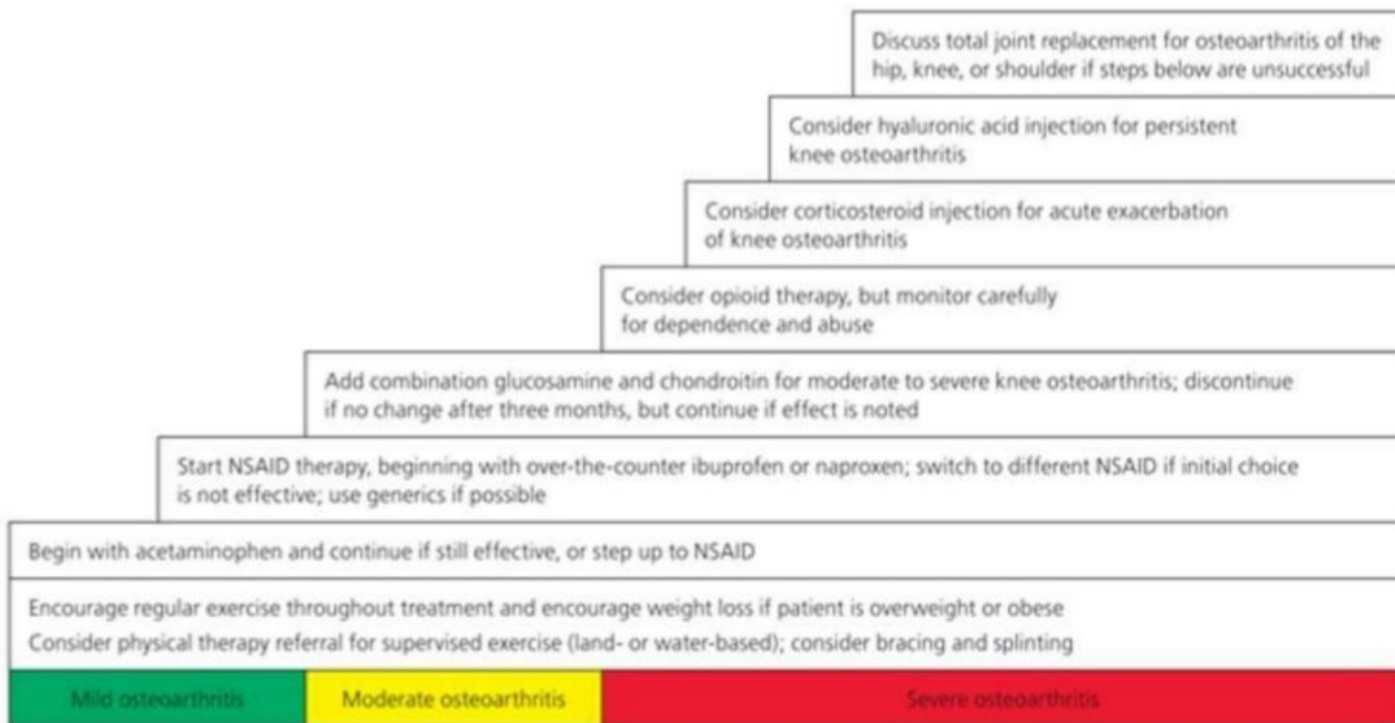
Treatment

(Long-term Management)

- Managing symptoms, such as pain, stiffness and swelling.
- Improving joint mobility and flexibility.
- Maintaining a healthy weight.
- Getting enough of exercise.

Treatment

(Stepped-Care Approach)



Treatment (Surgery)

- Arthroscopy.
- Osteotomy.
- Arthroplasty
(particularly with knee
or hip osteoarthritis).
- Fusion.



Total Knee Replacement.

Prognosis

- The prognosis in patients with osteoarthritis depends on the joints involved and on the severity of the condition.
- No proven disease- or structure-modifying drugs for osteoarthritis are currently known; consequently, pharmacologic treatment is directed at symptom relief.
- Patients with osteoarthritis who have undergone joint replacement have a good prognosis, with success rates for hip and knee arthroplasty generally exceeding 90%.

Prophylaxis

Control Weight.

Exercise.

Avoid Injuries or Get Them Treated.

Diet.

Reducing Osteoarthritis Pain.