



Osteoarthritis

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OA - Definition

- ▶ Heterogeneous group of conditions resulting in common histopathologic and radiologic changes involving
- ▶ Entire joint organ, including:
 - ▶ the articular cartilage
 - ▶ the subchondral bone and
 - ▶ the synovium.

Epidemiology

- ▶ Internationally, osteoarthritis is the most common articular disease. Estimates of its frequency vary across different populations.
- ▶ 80-90% of individuals older than 65 years have evidence of radiographic osteoarthritis.
- ▶ the prevalence of osteoarthritis is higher among women than among men.
- ▶ Interethnic differences in the prevalence of osteoarthritis have been noted.

Involved joints

Weight-bearing joints, including:

- the knees

- the hips

- cervical and lumbosacral spine

- feet.

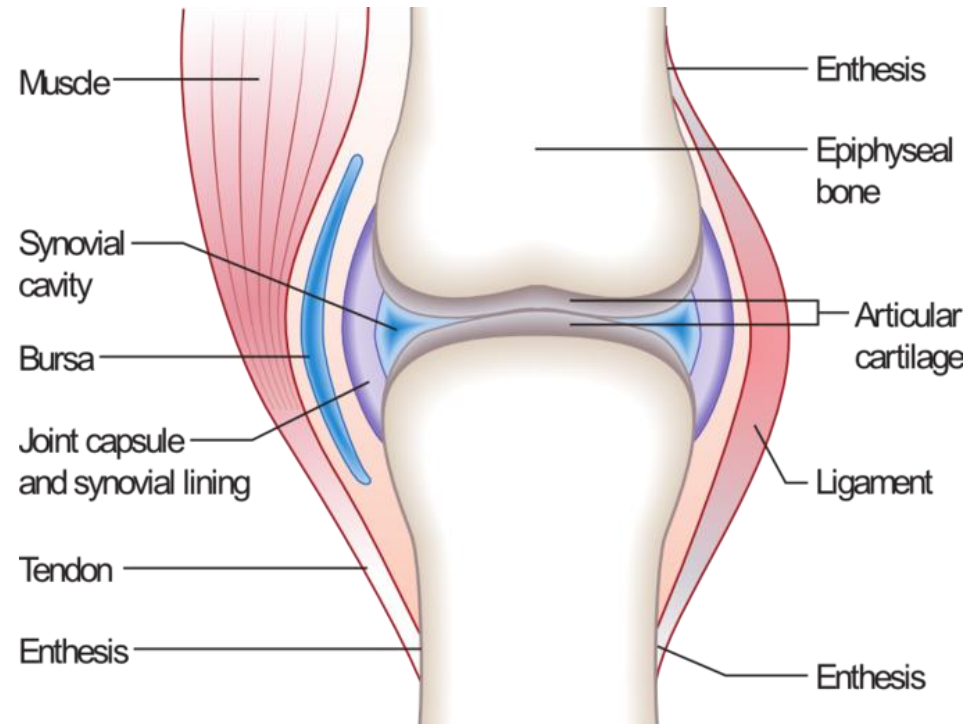
Non weight bearing joints:

- the(DIP), the(PIP), and the(CMC) joints.

Synovial Joints

- ▶ Articular cartilage
- ▶ Subchondral bone
- ▶ Synovial membrane
- ▶ Synovial fluid
- ▶ Joint capsule

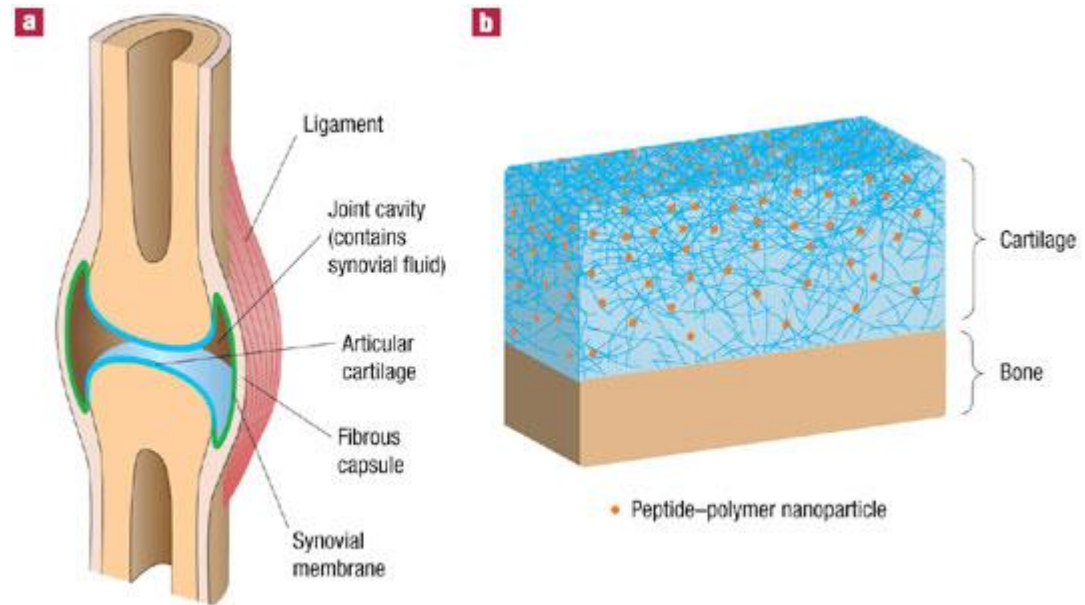
Synovial joint anatomy



The normal articular surface of synovial joints

- ▶ articular cartilage (chondrocytes) surrounded by extracellular matrix includes
- ▶ proteoglycans and collagen. The cartilage facilitates joint function and protects the underlying subchondral bone by
- ▶ distributing large loads,
- ▶ maintaining low contact stresses, and
- ▶ reducing friction at the joint.

Synovial cartilage



Synovial Fluid

- ▶ Synovial fluid is formed by (synoviocytes).
- ▶ Synovial cells also manufacture hyaluronic acid (HA, also known as hyaluronate), a glycosaminoglycan that is the major noncellular component of synovial fluid.
- ▶ Synovial fluid supplies nutrients to the avascular articular cartilage; it also
- ▶ provides the viscosity needed to absorb shock from slow movements
- ▶ provides elasticity required to absorb shock from rapid movements.

Pathogenesis

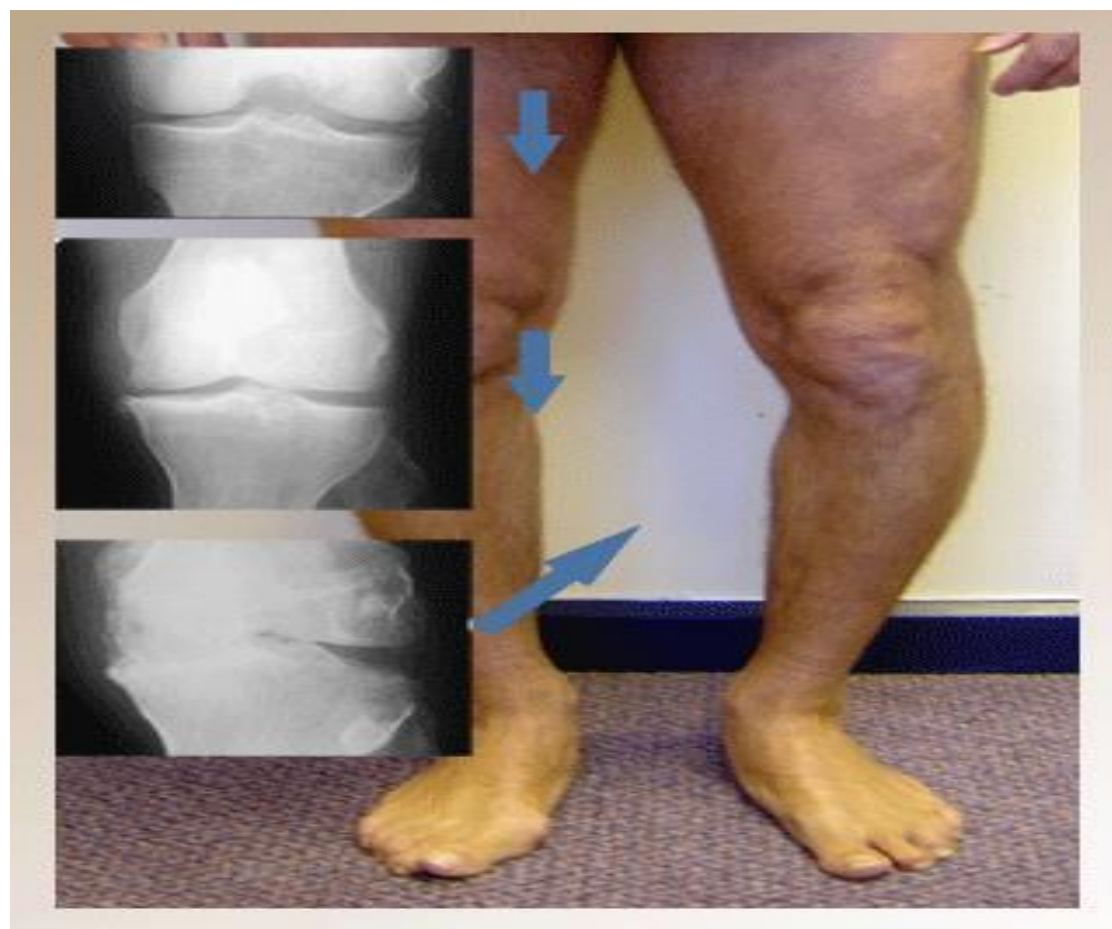
- ▶ Swelling of the cartilage usually occurs
- ▶ the level of proteoglycans eventually drops very low, the cartilage softens and lose elasticity and compromising joint surface integrity.
- ▶ Flaking and fibrillations (vertical clefts) develop along on the surface of an osteoarthritic joint. Over time, the loss of cartilage results in loss of joint space.
- ▶ a greater loss of joint space occurs at those areas experiencing the highest loads.

Cartilage changes

MORPHOLOGY



Clinical and Radiological



Bone changes

- ▶ Bone denuded of its protective cartilage continues to articulate with the opposing surface.
- ▶ Eventually, the increasing stresses exceed the biomechanical yield strength of the bone.
- ▶ The subchondral bone responds with vascular invasion and increased cellularity, becoming thickened and dense (a process known as eburnation) at areas of pressure.

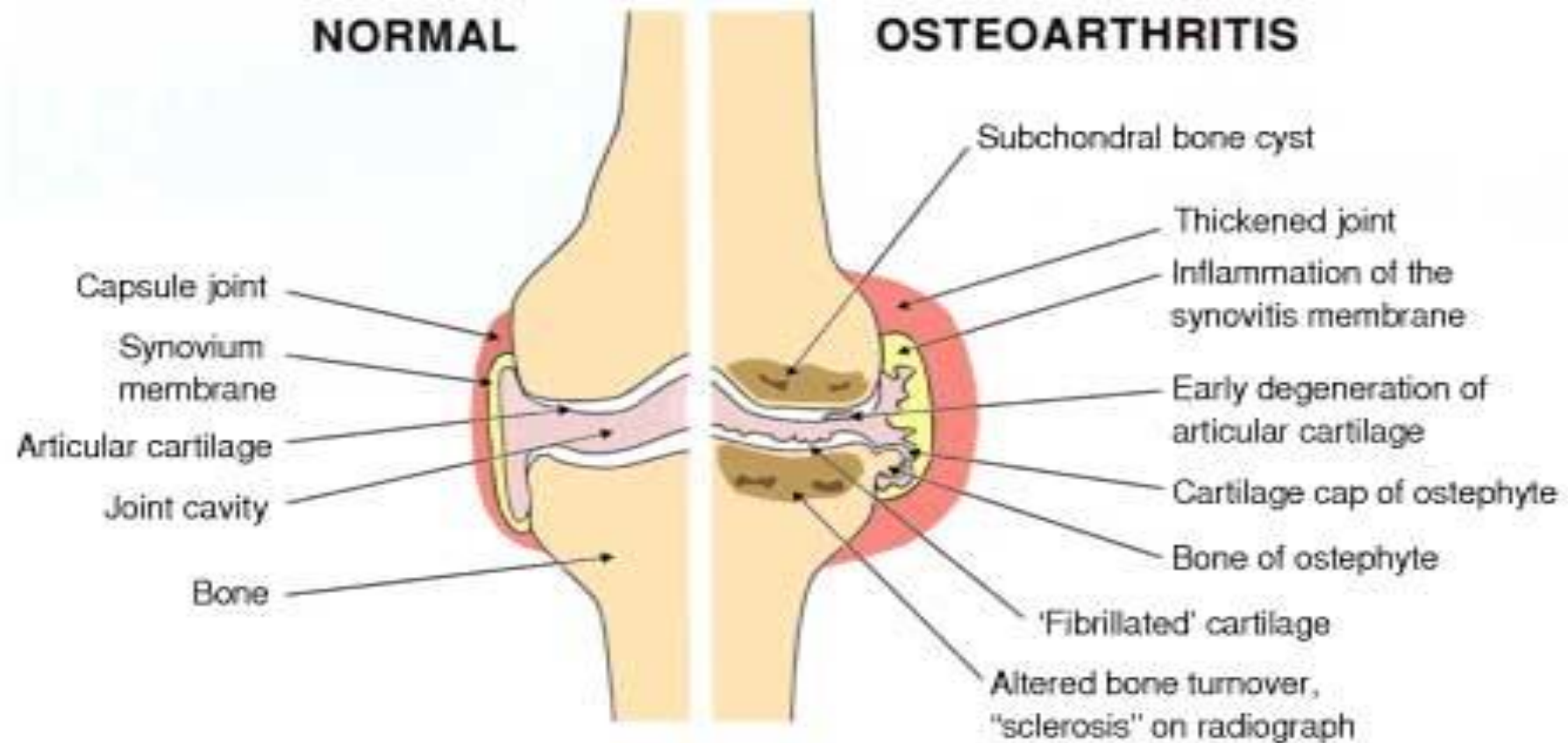
Bone changes

- ▶ subchondral bone undergo cystic degeneration.
- ▶ Osteoarthritic cysts are also referred to as subchondral cysts, pseudocysts, or geodes and may range from 2 to 20 mm in diameter.
- ▶ Osteoarthritic cysts in the acetabulum are termed Egger cysts.

Joint changes

- ▶ vascularization of subchondral marrow,
- ▶ osseous metaplasia of synovial connective tissue, and
- ▶ ossifying cartilaginous protrusions lead to irregular outgrowth of new bone (osteophytes).
- ▶ Fragmentation of these osteophytes or of the articular cartilage itself results in the presence of intra-articular loose bodies (joint mice).

Joint changes



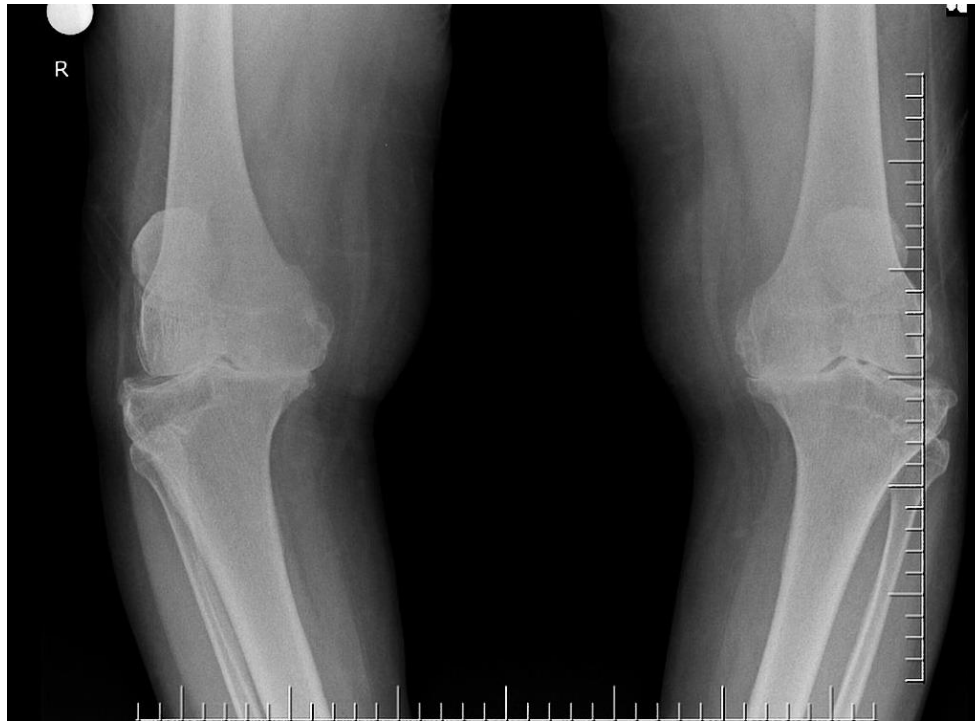
Etiology

- ▶ Risk factors-
- ▶ Age, obesity, trauma, genetics, hypogonadism, muscle weakness, repetitive use, Infection, crystal deposition, acromegaly, previous inflammatory arthritis (burnt-out rheumatoid arthritis)
- ▶ Heritable metabolic causes (alkaptonuria, hemochromatosis, Wilson disease) Hemoglobinopathies (sickle cell disease and thalassemia) Neuropathic disorders leading to a Charcot joint (syringomyelia, tabes dorsalis, and diabetes) Underlying morphologic risk factors (congenital hip dislocation and slipped femoral capital epiphysis)
- ▶ Disorders of bone (Paget disease and avascular necrosis) Previous surgical procedures (meniscectomy) Diabetes mellitus ^[44]

Radiographic changes



Radiological changes

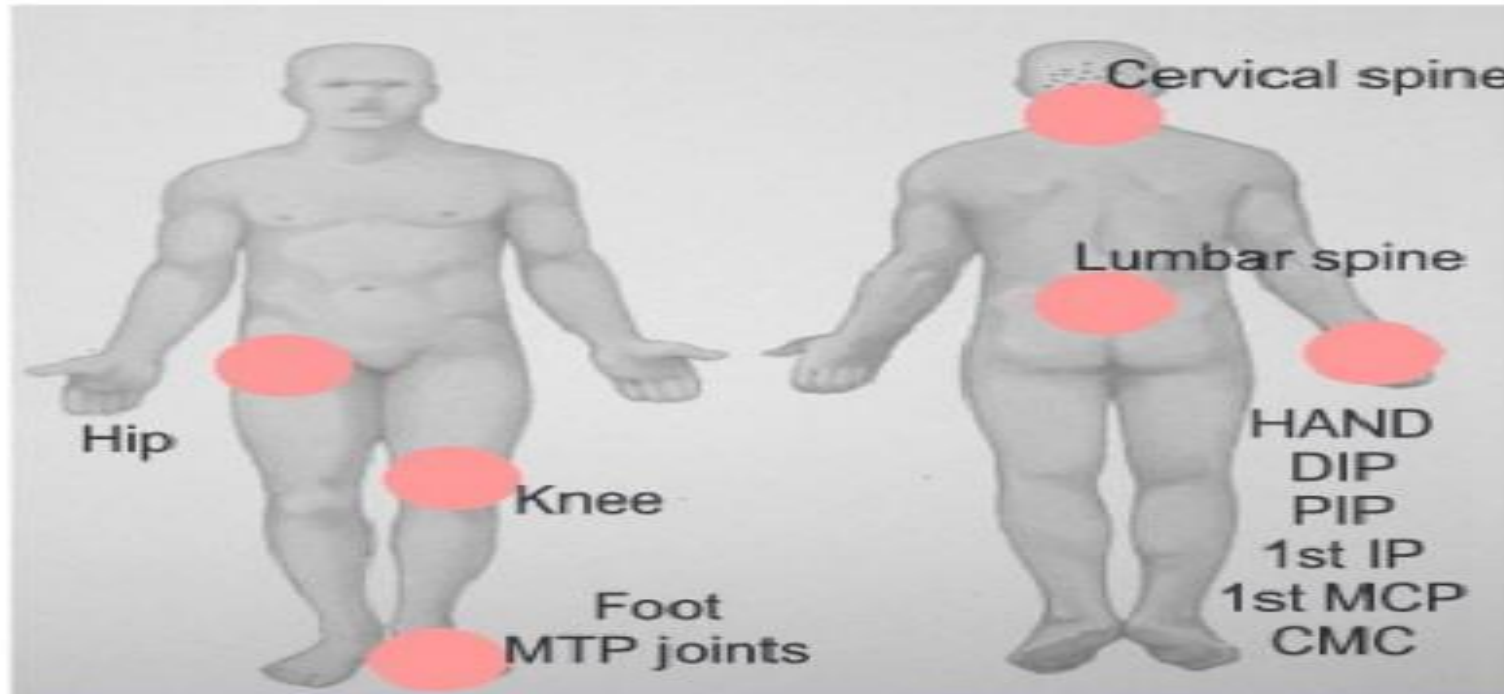


Osteoarthritis Progression

- ▶ Stage 1- breakdown of the cartilage matrix occurs.
- ▶ Stage 2 - involves the fibrillation and erosion of the cartilage surface
- ▶ Stage 3 - a chronic inflammatory response in the synovium.
- ▶ Further Progression - the above events alter the joint architecture, compensatory bone overgrowth occurs. joint architecture is changed mechanical and inflammatory stress occurs on the articular surfaces, the disease progresses unchecked.

PGOA

Osteoarthritis - Anatomical Distribution



Erosive OA



Chonromalcia Patellae



Differential Diagnosis

- ▶ Crystalline arthropathies (ie, gout and pseudogout)
- ▶ Inflammatory arthritis (eg, rheumatoid arthritis)
- ▶ Seronegative spondyloarthropathies (eg, psoriatic arthritis and reactive arthritis)
- ▶ Septic arthritis or postinfectious arthropathy
- ▶ Fibromyalgia
- ▶ Tendonitis

Work Up

- ▶ Laboratory
- ▶ Plain Radiography
- ▶ CT scan, MRI scan, ultrasonography
- ▶ Bone scintigraphy
- ▶ Arthrocentesis

Treatment

- ▶ Non pharmacologic-
Life style modification, physical and rehab therapy
- ▶ Pharmacotherapy
 - Arthroscopy
 - Osteotomy
 - Arthroplasty
 - Fusion and joint Lavage
 - Stem cell therapy

References

- 1.1.Hunter, W. Of the structure and diseases of articulating cartilages. *Phil. Trans. Royal Soc.* **470**, 514–521 (1743).
- 2.2.National Collaborating Centre for Chronic Conditions (UK).
- 3.*National Clinical Guideline for Care and Management in Adults*(Royal College of Physicians of London, 2008).
- 3.3.Felson, D. T. An update on the pathogenesis and epidemiology of osteoarthritis. *Radiol. Clin. North Am.* **42**, 1–9 (2004).
- 4.4.WHO. The World Health Report 2002: reducing risks, promoting healthy life (WHO, 2002).
- 5.5.Centers for Disease Control and Prevention (CDC). Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation—United States, 2010–2012. *MMWR Morb. Mortal. Wkly Rep.* **62**, 869–873 (2013).