

Chapter 10

Inflammatory and Non-Inflammatory Arthritis

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1) Osteoarthritis :

Osteoarthritis (OA) is a progressive, whole-organ disease of synovial joints characterized by breakdown of articular cartilage, subchondral bone remodeling, osteophyte formation, and low-grade synovial inflammation.

• Etiology & Classification

- Primary (Idiopathic): Most common; driven by age-related biomechanical wear, genetic predisposition, and metabolic dysregulation (e.g., localized to nodal hand joints, hip, or knee; generalized OA).

-Secondary: Resulting from an identifiable underlying cause:

Post-traumatic

Anatomical/Congenital: DDH , SCFE

Metabolic/Endocrine

Inflammatory/Infectious sequelae

• Pathophysiology :

OA involves an imbalance between chondrocyte-mediated repair and catabolic destruction:

- Extracellular Matrix (ECM) Breakdown: Chondrocytes upregulate matrix metalloproteinases (MMP-13) and aggrecanases (ADAMTS-4 and ADAMTS-5), degrading type II collagen and proteoglycan aggrecans. Water content initially increases (loss of matrix tension), followed by cartilage fibrillation, vertical fissuring, and full-thickness chondral loss.

- Subchondral Remodeling: Loss of shock absorption triggers microfractures, vascular invasion, and dense bone formation

(eburnation). Synovial fluid forced through microcracks under pressure leads to intraosseous fibrous cystic degeneration (geodes).

- Osteophytosis: Chondro-osteogenic outgrowth stimulated at the joint margins via local overexpression of TGF- β and BMP-2.

- Synovitis: Low-grade, macrophage-driven inflammatory response triggered by cartilage breakdown products, driving secondary pain and joint effusions.

• Clinical Features

Symptoms: Insidious, activity-related “mechanical” joint pain relieved by rest; transient morning stiffness lasting < 30 minutes (“gelling” phenomenon); reduced functional mobility (stairs, rising from chairs).

Signs: Joint line tenderness, coarse crepitus, reduced range of motion, cold effusions, and characteristic hand deformities (Heberden nodes at DIPJs, Bouchard nodes at PIPJs).

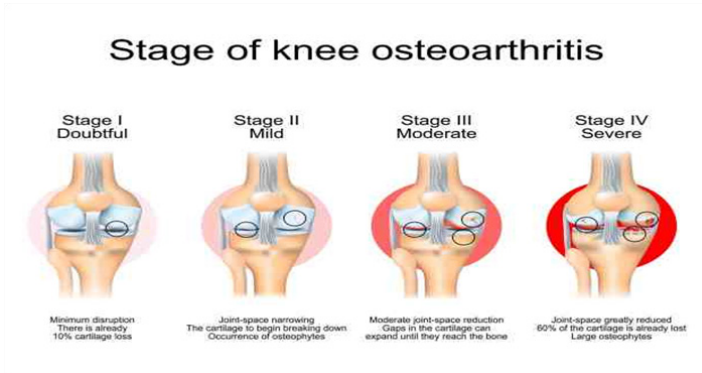
Alignment: Progressive mechanical axis deviation (most commonly genu varum in knee OA due to predominant medial compartment involvement).

Radiological Evaluation & Grading

Weight-bearing, plain radiographs remain the diagnostic gold standard.

The cardinal signs on plain radiography follow the L-O-S-S mnemonic:

- L – Loss of joint space (characteristically asymmetric)
- O – Osteophytes (marginal)
- S – Subchondral sclerosis
- S – Subchondral cysts



1) Ankylosing Spondylitis (AS)

This is a generalized chronic inflammatory disease which mainly effects the spine and sacroiliac joints. These patients are characterized by pain and stiffness of the back with variable involvement of hips, and shoulders. It has prevalence of about 0.1 to 0.2 percent and males are commonly effected with ratio of 2:1 to 10:1 in age group of 15-25 years. It has strong association with HLA-B 27 marker. It has insidious onset with HLA-B 27 present in over 95% of Caucasian patients. This disease causes two main lesions like synovitis of diarthrodial joints and inflammation at the Fibro-osseous junction of syndesmotic joints and tendons.

Synovitis produces destruction of articular cartilage of sacroiliac and vertebral facets. Costovertebral joints are also frequently involved.

Inflammation of Fibro-osseous junctions affects the intervertebral discs, sacroiliac ligaments, symphysis pubis and bony insertions of ligaments. (enthesopathy) Inflammation of these causes granulation tissue formation with erosion of bone, then these lesion are replaced with fibrous tissue and ultimately produces ossification leading to ankylosis of joints.

C/F

This has insidious onset which was commonly misdiagnosed as simple mechanical back pain in young adults. Patients complain of back ache with stiffness over years before a diagnosis is made. In 10% cases it starts as an asymmetrical inflammatory arthritis. These symptoms increase in early morning and after inactivity. Sometimes symptoms of pain in buttocks and thigh can be confused with sciatica and wrongly treated as a case of intervertebral disc prolapse. These symptoms (pain and stiffness) gradually become continuous with general symptoms of fatigue, pain and swelling of joints, tenderness at insertion of Achilles tendon, and intercostal pain and tenderness. Sacroillitis is present in 10% females due to chronic pelvic inflammatory diseases.

In early cases, there will be slight flattening of lower back with restriction of extension of spine. There may be diffuse tenderness of spine and sacroiliac joints.

In late presentation, there will be loss of normal lumbar lordosis, increased thoracic kyphosis and forward thrust of neck. Spinal movements are decreased in all directions. Patients maintain standing posture with knee and hip slightly flexed. These two tests help in making the diagnosis.

Wall test: Patient is asked to stand with his back to the wall. Normally heels, buttocks, scapulae and occiput should touch to wall simultaneously. But these patients are unable to do this. Marked loss of cervical extension leads to restriction of line of vision in these patients.

Chest expansion: a normal adult is able to expand his chest more than 7cms, but in these patients, chest expansion less than 5 cms is diagnosed as ankylosis spondylitis.

Peripheral joints are involved in one third of cases. There may be tenderness at ligaments and tendon insertions. (Enthesopathy)

Investigations: The ESR and CRP are elevated in active cases. HLA-B27 is present in 95% of cases. RF is usually negative in these patients.

Radio logically:

Flattening of normal anterior concavity of vertebral body (squaring) is the earliest change. Ossification of the ligaments around intervertebral discs produce symmetrical bony spurs called syndesmophytes which looks like a bamboo spine.

Osteoporosis and erosion of peripheral joints is present in long standing cases.

Treatment:

General measures: Patients are advised to remain active. They are taught to maintain satisfactory posture and perform spinal extension exercises. Rest and immobility is contraindicated in these cases.

NSAIDS: These can be given to control pain and decrease soft tissue stiffness.

TNF inhibitors: These agents results in significant improvement in disease activity and remission.

Surgical intervention: The established cases of ankylosis spondylitis require different surgical procedures like arthroplasty or various osteotomies for deformity correction.