MINISTERUL SĂNĂTĂŢII, MUNCII ŞI PROTECŢIEI SOCIALE AL REPUBLICII MOLDOVA UNIVERSITATEA DE STAT DE MEDICINĂ ŞI FARMACIE „NICOLAE TESTEMIŢANU”

Medical imaging in rheumatology


A
B


a.
b.


A


B


A
B

Medical imaging in rheumatology.

Principles of radiological investigations in rheumatology. Methods used, technique of performance. Advantages disadvantages. Indications, contraindications.

Imaging semiology in rheumatoid arthritis. Differential diagnosis.

Imaging semiology in gout. Differential diagnosis.

Imaging semiology in osteoarthritis. Differential diagnosis.

Imaging semiology in systemic lupus erythematosus. Differential diagnosis.

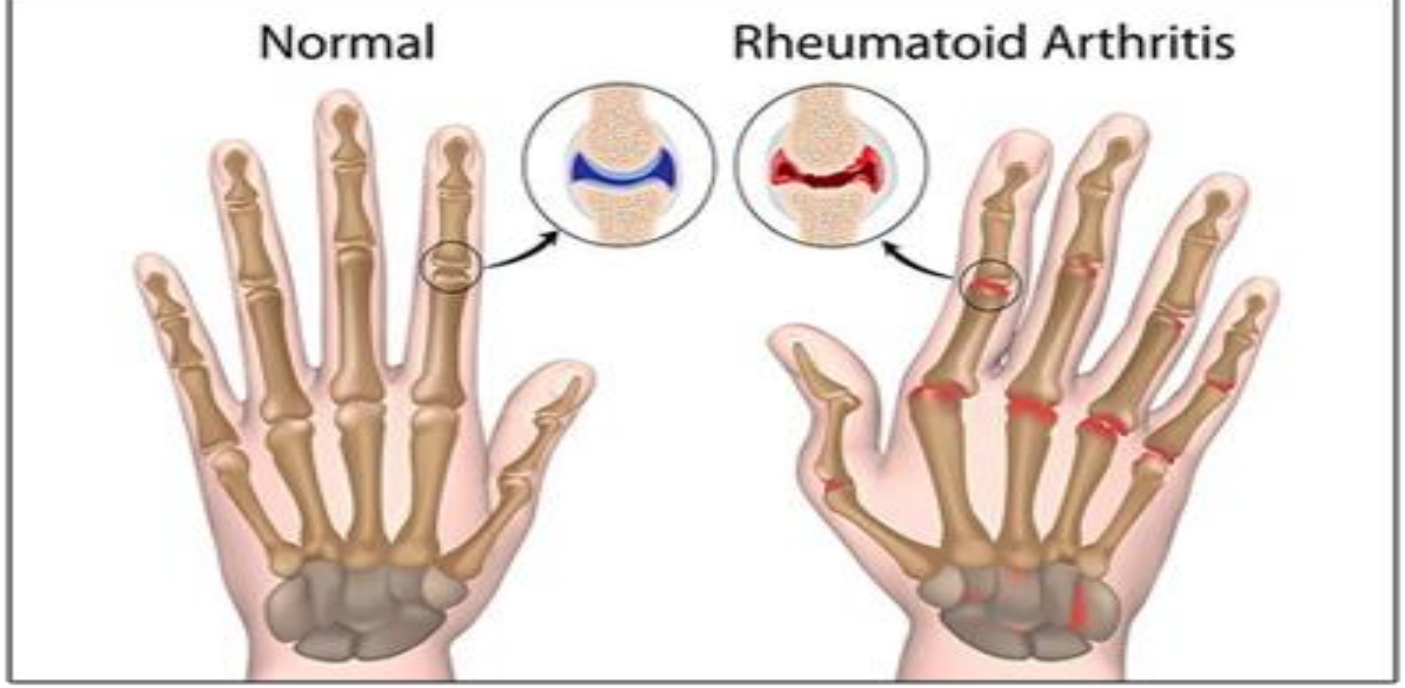
Rheumatology

Rheumatology (Greek *ῥεῦμα, rheûma*, flowing current) is a branch of medicine devoted to the diagnosis and therapy of rheumatic diseases. Physicians who have undergone formal training in rheumatology are called **rheumatologists**. Rheumatologists deal mainly with immune-mediated disorders of the musculoskeletal system, soft tissues, autoimmune diseases, vasculitides, and inherited connective tissue disorders.

Methods

Diagnostic means used in rheumatology include: biochemical tests, immunological tests (autoantibodies), genetic tests, imaging examinations (radiographs, musculoskeletal ultrasound, joint MRI), functional tests (electromyogram), joint puncture, joint and soft tissue biopsies, measurement bone density (DEXA osteodensitometry).

Exploratory imagination (ecography, radiography, RMN, CT) with the result of analysis or effect.



Rheumatoid arthritis (RA)

Rheumatoid arthritis (RA) is a chronic autoimmune multisystemic inflammatory disease that affects many organs but predominantly attacks the synovial tissues and joints.

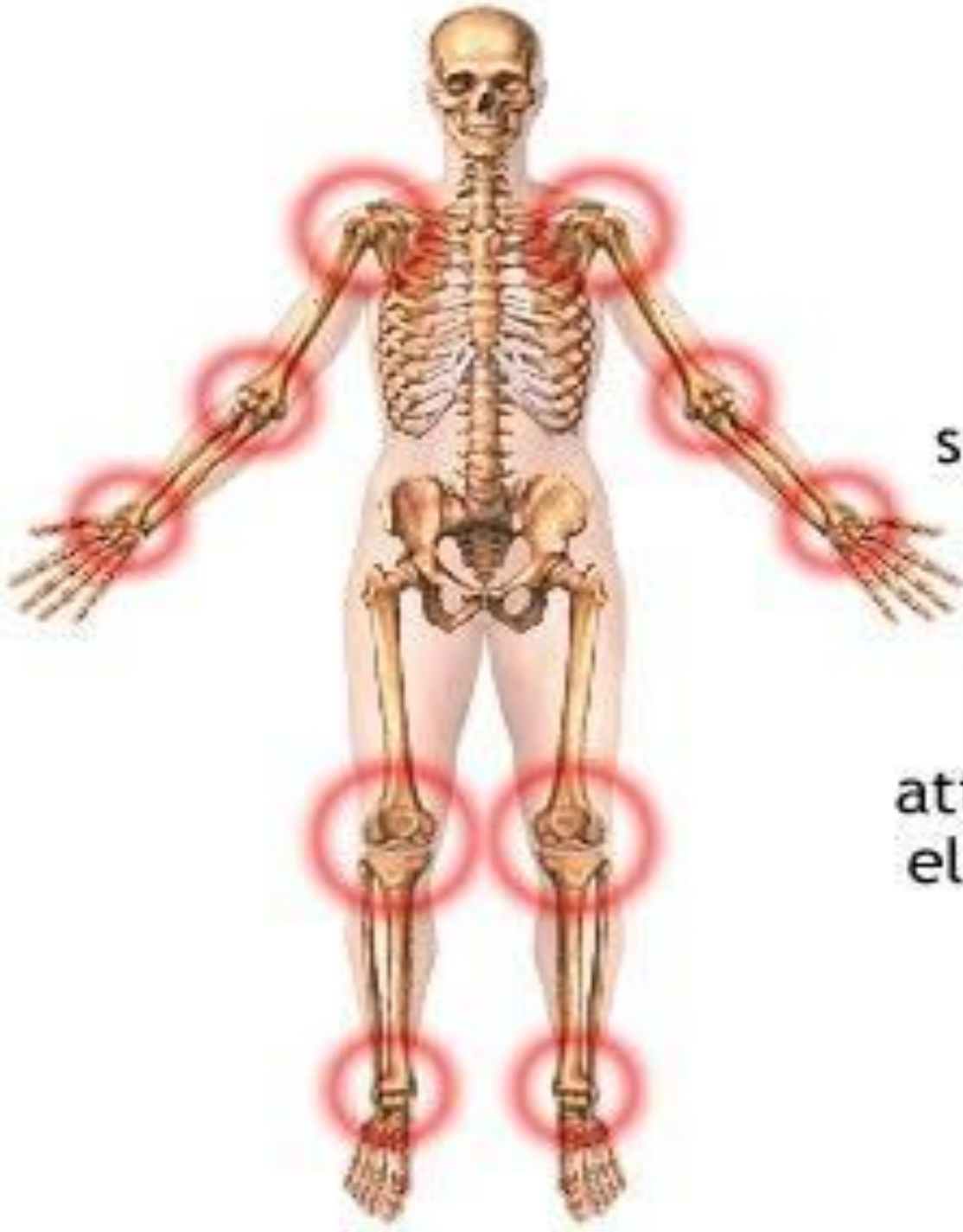
The overall prevalence is 0.5-1% and the disease is 2-3 times more common in women .
Onset is generally in adulthood, peaking in the 4^{th} and 5^{th} decades. The pediatric condition, juvenile rheumatoid arthritis, is discussed separately.

Clinical presentation

The clinical features can be broadly categorised as articular and extra-articular. Generally, the onset of the condition may be insidious or abrupt, and early features commonly include tiredness, malaise, and generalised aches.

Articular features generally develop prior to extra-articular features.

Articular features include a symmetrical deforming peripheral polyarthropathy that classically affects the fingers and hands, but also commonly involves the feet and can involve multiple other joints. The arthropathy has a classic inflammatory phenotype, with joint stiffness, reduced range of motion, reduce functionality, and a 'boggy' feel to palpation. For further details, please refer to musculoskeletal manifestations of rheumatoid arthritis.



Rheumatoid arthritis usually affects joints symmetrically (on both sides equally), may initially begin in a couple of joints only, and most frequently attacks the wrists, hands, elbows, shoulders, knees and ankles

Algorithm for interpreting standard radiographs - A, B, C, D, E, F, S

A - positional arrangement:

- ulnar deviation in the MCF joints;
- subluxation in the FMC ankylosed joints;

Ankylosis:

- carpal bones;
- intervertebral joints;
- bilateral joints;
- unilateral sacroiliac joints.

B - mineral base of the bones:

- polyarticular juxtaarticular osteoporosis;
- mono-articular juxtaarticular osteoporosis;
- sclerodactyly of the distal phalanges.

C - calcifications:

- paraarticular calcinosis;
- cartilage calcinosis.

Cyst

- poorly delimited juxtaarticular;
- well delimited;
- delimited on the background of degenerative-dystrophic.

D - distribution of affect:

- symmetrical damage to the joints of the hands and soles;
- symmetrical damage to peripheral joints.

E - erosions:

- on the articular surfaces of the hands and soles;
- unique with eaves-edges;
- in the interphalangeal distal joints.

F - shape:

- buttonhole or swan neck;
- walrus paw.

S - structure of soft tissues and nails:

- nail hypertrophy.

Cartilaginous space:

- uniform symmetrical narrowing;
- asymmetric narrowing in pressure areas.

The radiological picture in various phases of AR is characterized by:

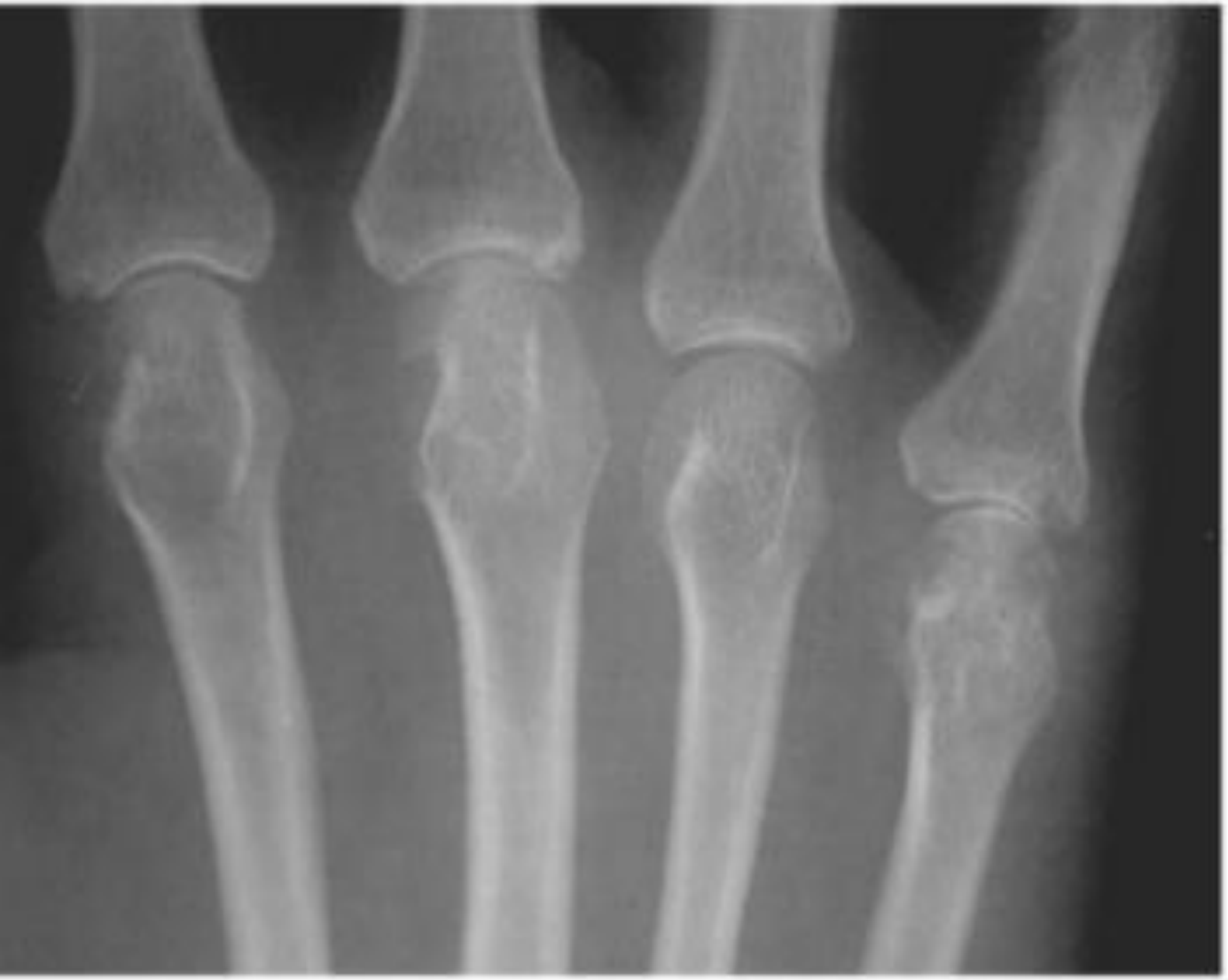
1. Edema of soft tissues.
2. Juxtaarticular osteoporosis.
3.Destruction of cartilage with diffuse narrowing a joint space.
4. Bone erosions in areas without a coating cartilaginous.
5. Ankylosis of the intercarpal joints.

What is the significance of the radiologic findings in rheumatoid arthritis?

It is universally accepted that the radiological examination shows advanced RA changes – the narrowing of the joint space and margin erosions – that result from the destructive activity of the pannus.

The basic pathology of rheumatoid arthritis is inflammation and proliferation of synovium (pannus), which leads to the various radiographic appearances. Periarticular swelling is due to a combination of pannus and joint effusion. Fusiform soft tissue swelling is characteristic at the proximal interphalangeal joints of the hands, with focal soft tissue swelling at the metacarpophalangeal joints, at the dorsum of the wrist, and over the ulnar styloid. In the feet, soft tissue swelling is common at the metatarsophalangeal joints, especially the fifth. Rheumatoid arthritis can affect any synovial structure, including bursae and tendon sheaths. Bursitis can cause areas of ill-defined soft tissue planes or focal soft tissue prominence; this is most evident radiographically in the retrocalcaneal bursa and olecranon bursa. Tenosynovitis is evident radiographically as diffuse or longitudinally oriented soft tissue swelling, commonly involving the tendons of the wrist. Inflammatory nodular soft tissue lesions may occur, called “rheumatoid nodules.” Rheumatoid nodules can occur in patients with rheumatoid arthritis and appear as focal soft tissue masses, usually at sites of chronic friction, such as the extensor surfaces of the forearm, as well as the hands and feet.

Joint narrowing
Soft tissue swelling/effusions
Marginal rarefaction representing early erosions



Early

Well-defined erosions
Advanced joint narrowing
Subchondral cysts

Late

Periarticular osteopenia is a classic radiographic feature, especially in early stages of rheumatoid arthritis of the hands and feet, although a generalized pattern of osteopenia can also occur. Involved joints generally demonstrate concentric or uniform joint narrowing related to diffuse cartilage loss. However, in weight-bearing joints there may be more severe narrowing at the weight-bearing surface. Axial migration can occur at the hips because of bone remodeling at the central portion of the acetabulum, with inward bowing of the iliopectineal line, called *protrusio acetabuli*. Characteristic marginal erosions result from thickened, inflammatory synovial tissue (pannus) eroding the bone at the bare area adjacent to the margin of the articular cartilage. Osseous proliferation is not a feature of rheumatoid arthritis; however, osteophyte formation can occur in longstanding rheumatoid arthritis as a result of superimposed secondary osteoarthritis.

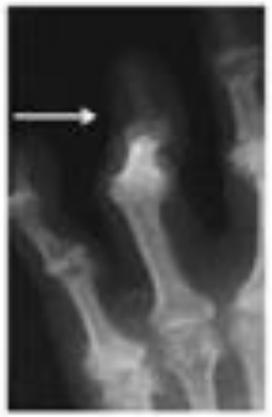
FIG : 13 : RADIOGRAPH OF HAN

Deformities of the hands and feet are common in rheumatoid arthritis for a variety of reasons: laxity and distention of the joint capsule, ligamentous laxity or disruption, tendinopathy or tendon tears, and altered muscle tone. The “swan neck” deformity is hyperextension at the proximal interphalangeal joint and flexion at the distal interphalangeal joint. The “boutonière” deformity is flexion at the proximal interphalangeal joint and hyperextension at the distal interphalangeal joint. These deformities result from imbalance of the flexor and extensor tendons. Subluxations at the metacarpophalangeal and metatarsophalangeal joints are also common: The digits of the hands deviate in an ulnar direction (“windswept hand” appearance); in the foot, hallux valgus is very common and may be severe, leading to overlap of the first and second toes. In the hands, the carpal bones commonly erode (carpal-dominant involvement), with ligamentous disruption and laxity causing carpal instability patterns. In more severe cases, the process of erosion and instability may reach a point at which there is “carpal collapse,” with the metacarpal bases nearly apposed to the radius. The entire carpus and hand may slip in an ulnar direction, referred to as “ulnar translocation.” Carpal collapse and dissociation, in addition to mass effect from pannus, can cause impingement on the median nerve as it passes through the carpal tunnel, resulting in carpal tunnel syndrome.


Ulnar deviation
"windswept hand"
Boutonnière
deformity
Ulnar translocation of the carpus
Note extensive erosions in
Subluxation

Alignment - Swan Neck

Alignment - Boutonniere



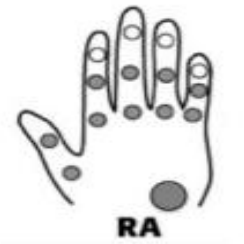
Alignment
Ulna translocation wrist

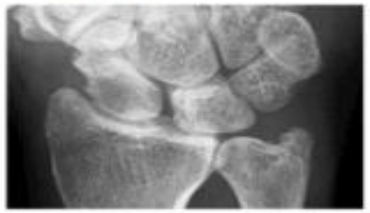
Rheumatoid Arthritis

- Bone mineralization
  - Periarticular osteopenia
  - Poor interobserver reliability (K 0.2)

Rheumatoid Arthritis

- Distribution
  - Metacarpophalangeal
  - Proximal interphalangeal
  - DRUJ/ulnar styloid



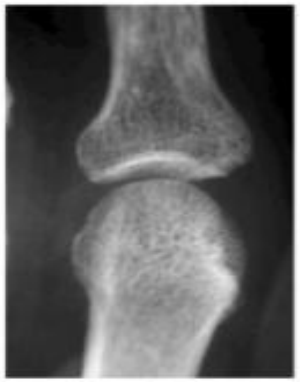


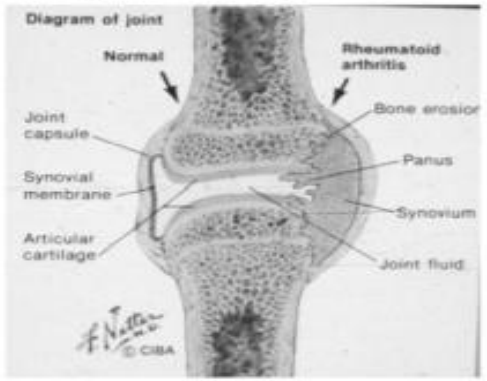
Foot Involvement

- Fifth metatarsal head
- Proximal involvement
  - Navicular-cuneiform
  - Calcaneocuboid
- Metatarsophalangeal joints

Rheumatoid Arthritis

- Erosions
- Pannus attacks at margins of the joint



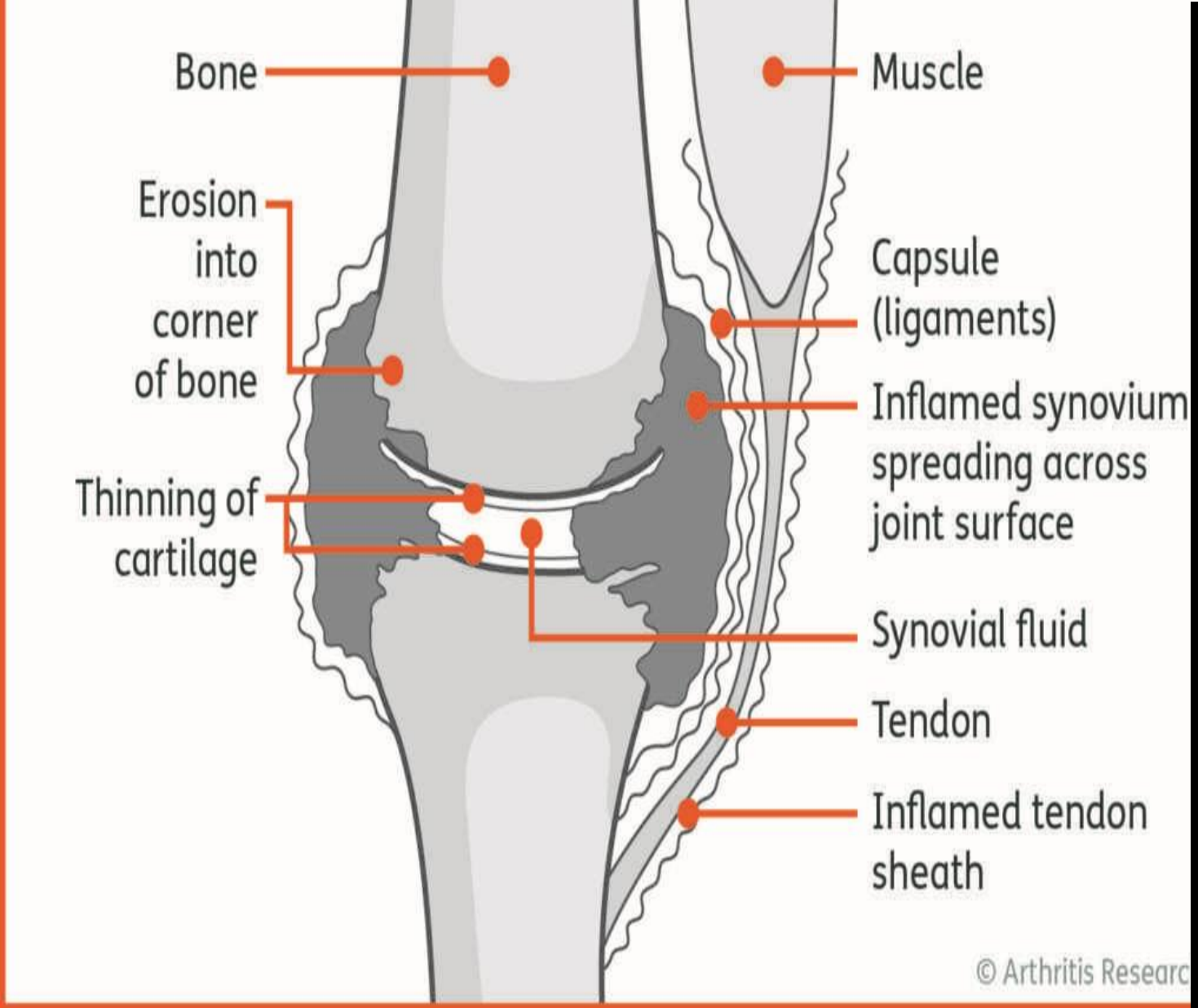


Rheumatoid Arthritis

- Soft tissues
  - Soft tissue swelling around joint deformity
  - Rheumatoid nodules

Figure 1

Figure 2

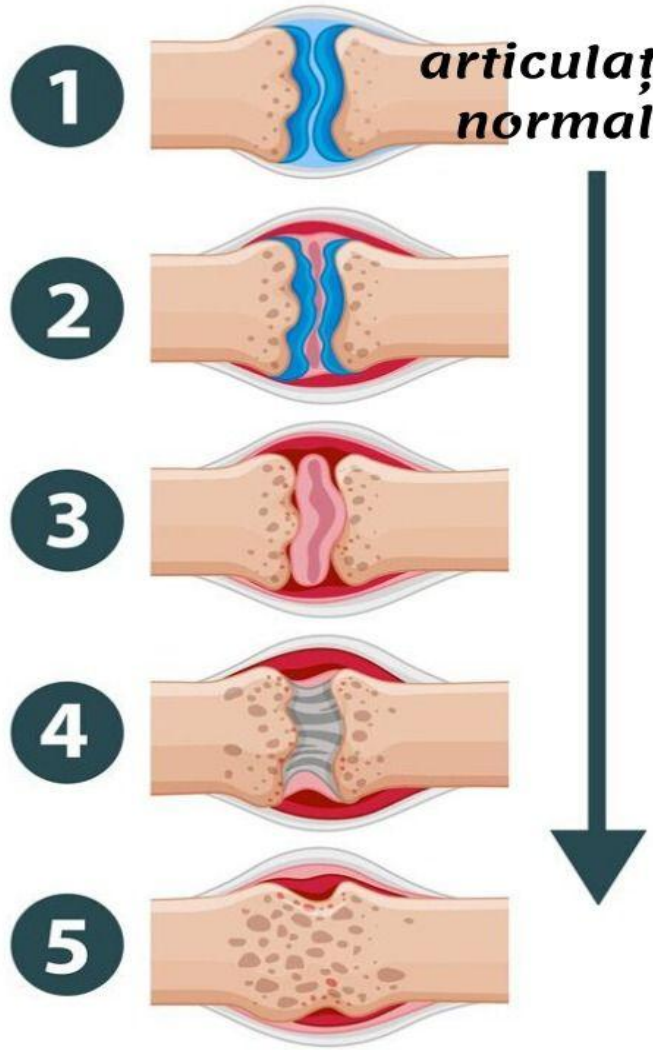


A joint badly affected by rheumatoid arthritis (front view)

Rheumatoid arthritis is most commonly recognized in the hands and feet; in fact, if there is a finding on a foot exam that is of questionable significance, it is often useful to evaluate radiographs of the hands, and vice versa. Distribution in the hands is characteristically more proximal than distal, commonly involving the carpus, as well as the metacarpophalangeal and proximal interphalangeal joints. In the feet/ankles, the distribution mimics that of the hands/wrists, with the metatarsophalangeal joints most commonly involved. Distribution is bilateral and symmetric; however, extent of involvement may not be the same from side to side.

ARTRITA REUMATOIDĂ

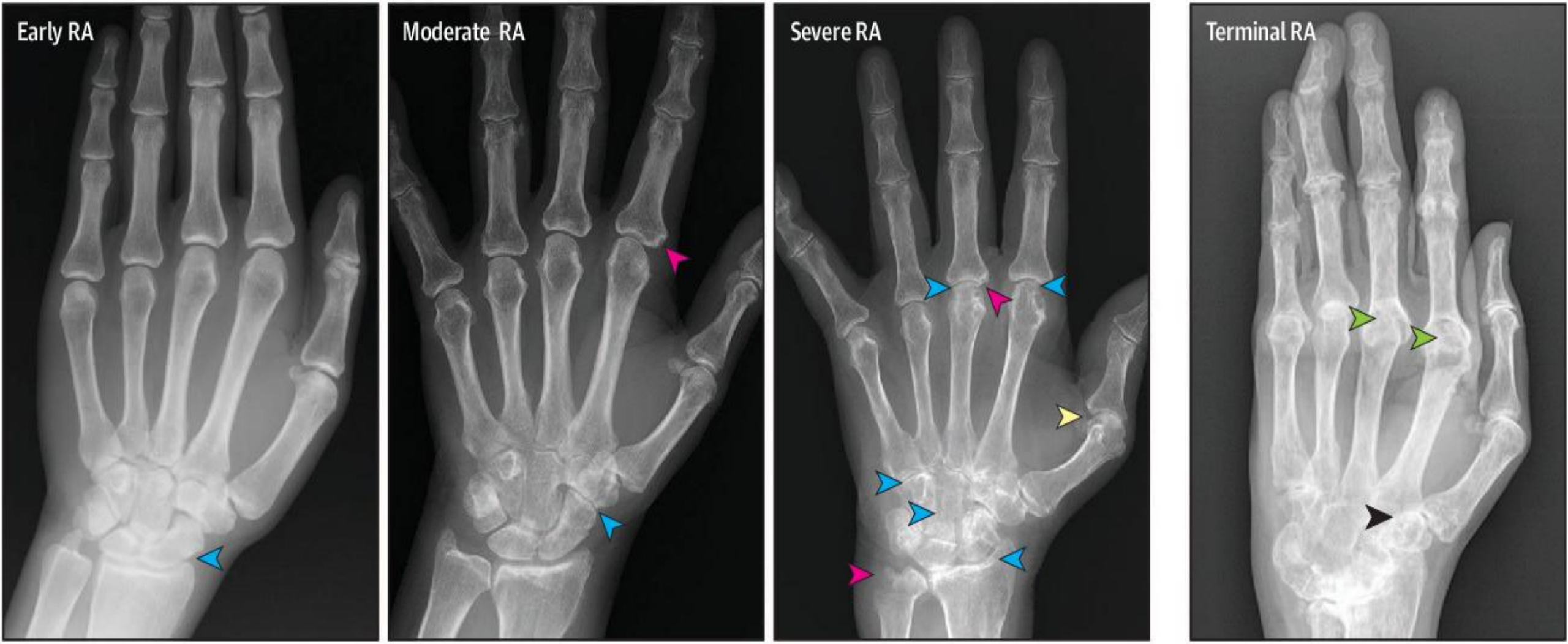
servus expert.



deformarea progresivă a articulației în artrita reumatoidă

A Progressive variations in rheumatoid arthritis (RA) radiologic findings

B Terminal RA radiologic findings



RA is a dynamic disease causing increasing damage to increasing numbers of

bone damage (erosions); malalignment can also be seen, especially at the fifth

Sharp-Van der Heijde modified score for PsA (total score 528)

Erosion score 0-320

0 = no erosions

1 = discrete erosion

2 = large erosion not passing the mid-line

3 = large erosion passing the mid-line

4 = combination of above

5 = combination of above

Joint space narrowing score 0-208

0 = normal

1 = asymmetrical or minimal narrowing up to a maxium of 25%

2 = definite narrowing with loss of up to 50% of the normal space

3 = definite narrowing with loss of 50-99% of the normal space or subluxation

4 = absence of a joint space, presumptive evidence of ankylosis, or complete luxation

Рис. 1. Больная Н. РА 1-й стадии.
Обзорная рентгенография кистей. Незначительный околосуставной остеопороз. Единичные кистовидные просветления костной ткани в пястных головках. Незначительно сужены щели отдельных пястно-фаланговы (ПЯФ) суставов

Рис. 2. Больная Н. РА 1-й стадии.
Обзорная рентгенография дистальных отделов стоп. Околосуставной остеопороз не определяется. Единичные кистовидные просветления костной ткани в 3 и 4 плюсне-фаланговых суставах слева. Суставные щели не сужены

Рис. 3. Больной З. РА 2-й стадии (незрозивная форма). Обзорная рентгенография кистей. Выраженный распространенный остеопороз. Множественные кистовидные просветления костной ткани. Сужены щели большинства суставов. Неровность контуров и небольшие деформации отдельных эпифизов костей. Эрозий, вывихов и подвывихов суставов не выявляется. Небольшие остеофиты на краях суставных поверхностей костей в дистальных и проксимальных межфаланговых (ПМФ) суставах (симптомы узелковой формы остеоартроза)

Рис. 4. Больной З. РА 2-й стадии (незрозивная форма). Обзорная рентгенография дистальных отделов стоп. Выраженный распространенный остеопороз. Множественные кистовидные просветления костной ткани в 1-х межфаланговых и 5-х плюсне-фаланговых (ПЛФ) суставах. Незначительно сужены щели отдельных ПЛФ суставов. Эрозий, вывихов и подвывихов суставов, деформаций костей во 2–5-х ПЛФ суставах не выявляется. Выраженный артроз 1-х ПЛФ суставов

Рис. 5. Больная Р. РА 2-й стадии (эрозивная форма). Обзорная рентгенография кистей. Незначительный околосуставной остеопороз. Множественные кистовидные просветления костной ткани (ПЯф суставы, запястья). Сужены щели суставов (больше в запястьях). Единичная эрозия левой ладьевидной кости

Рис. 6. Больная Р. РА 2-й стадии (эрозивная форма). Обзорная рентгенография дистальных отделов стоп. Умеренный околосуставной остеопороз. Множественные кистовидные просветления костной ткани и небольшие деформации плюсневых головок. Сужены щели суставов. Множественные эрозии в ПЛф суставах. Вывихов и подвывихов суставов нет

Рис. 7. Больная М. РА 3-й стадии.
Обзорная рентгенография кистей. Выраженный распространенный остеопороз. Множественные кистовидные просветления костной ткани. Сужены щели большинства суставов. Множественные эрозии костей и суставных поверхностей. Множественные вывихи и подвывихи суставов, деформаций эпифизов костей. Костных анкилозов нет. Асимметричное поражение суставов запястий (больше слева)

Рис. 8. Больная М. РА 3-й стадии.
Обзорная рентгенография дистальных отделов стоп. Выраженный распространенный остеопороз. Множественные кистовидные просветления костной ткани. Сужены щели многих суставов. Множественные эрозии костей и суставных поверхностей. Множественные вывихи и подвывихи суставов

Рис. 9. Больной П. РА 4-й стадии.
Обзорная рентгенография кистей. Утолщены и уплотнены мягкие ткани в запястьях и ПЯф. Выраженный распространенный остеопороз. Множественные кистовидные просветления костной ткани. Сужены щели всех суставов. Множественные эрозии костей и суставных поверхностей. Множественные вывихи и подвывихи суставов запястий и 4-го правого ПМф сустава. Множественные деформации эпифизов костей. Анкилозы суставов запястий. Коллапс костей запястий

Рис. 10. Больной П. РА 4-й стадии.
Обзорная рентгенография дистальных отделов стоп. Выраженный распространенный остеопороз. Множественные кистовидные просветления костной ткани. Сужены щели суставов. Множественные эрозии костей и суставных поверхностей. Множественные вывихи и подвывихи суставов, деформации многих костей. Эрозивные артриты суставов предплюсны

Extra-articular features include:

pulmonary involvement

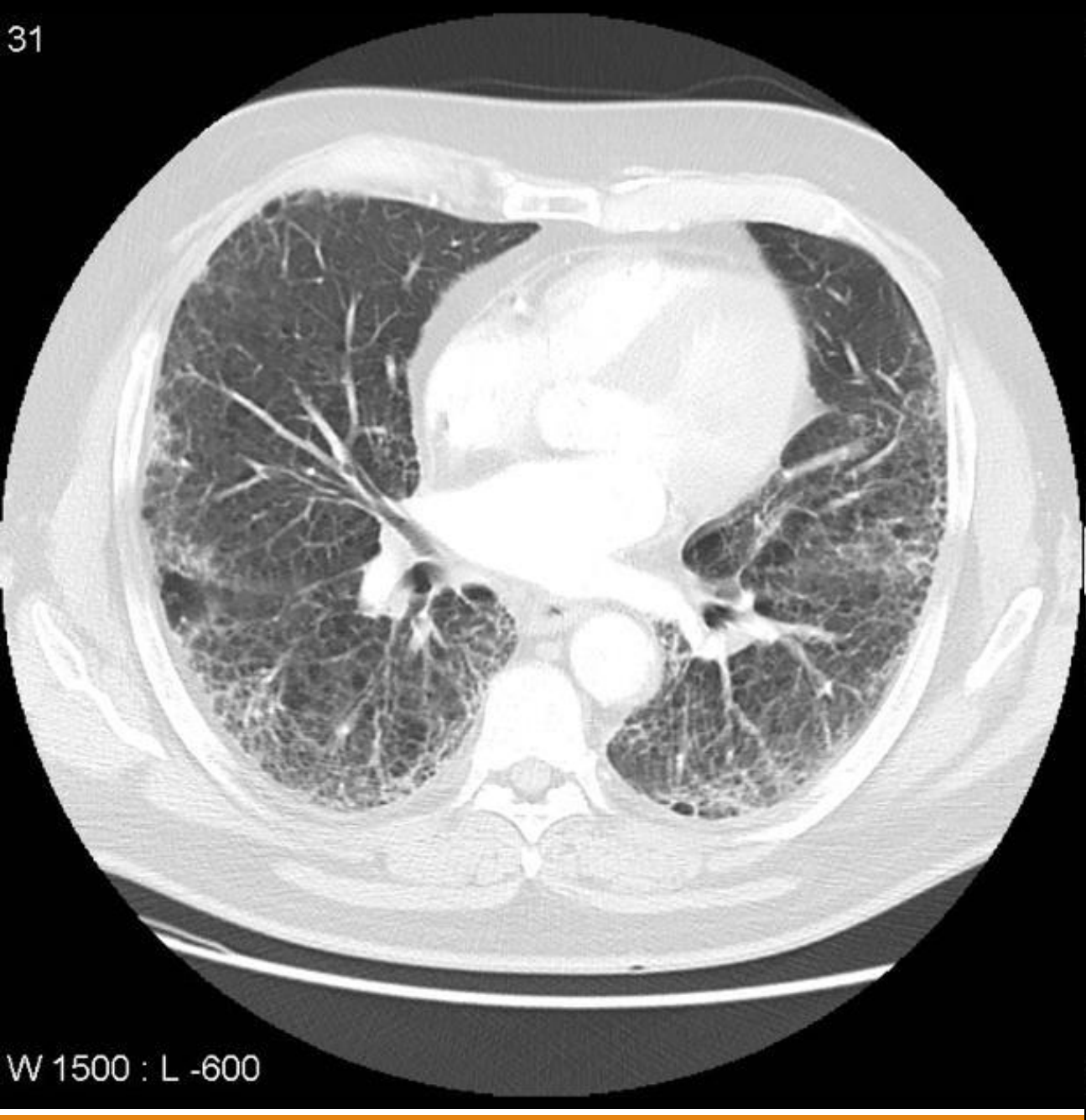
1. interstitial lung disease
2. pulmonary nodules
3. pleural effusion
4. Caplan syndrome : rheumatoid arthritis and pneumoconiosis (also known as rheumatoid pneumoconiosis, is the combination of seropositive rheumatoid arthritis and a characteristic pattern of fibrosis. Although first described in coal miners (coal workers' pneumoconiosis), it has subsequently been found in patients with a variety of pneumoconioses)

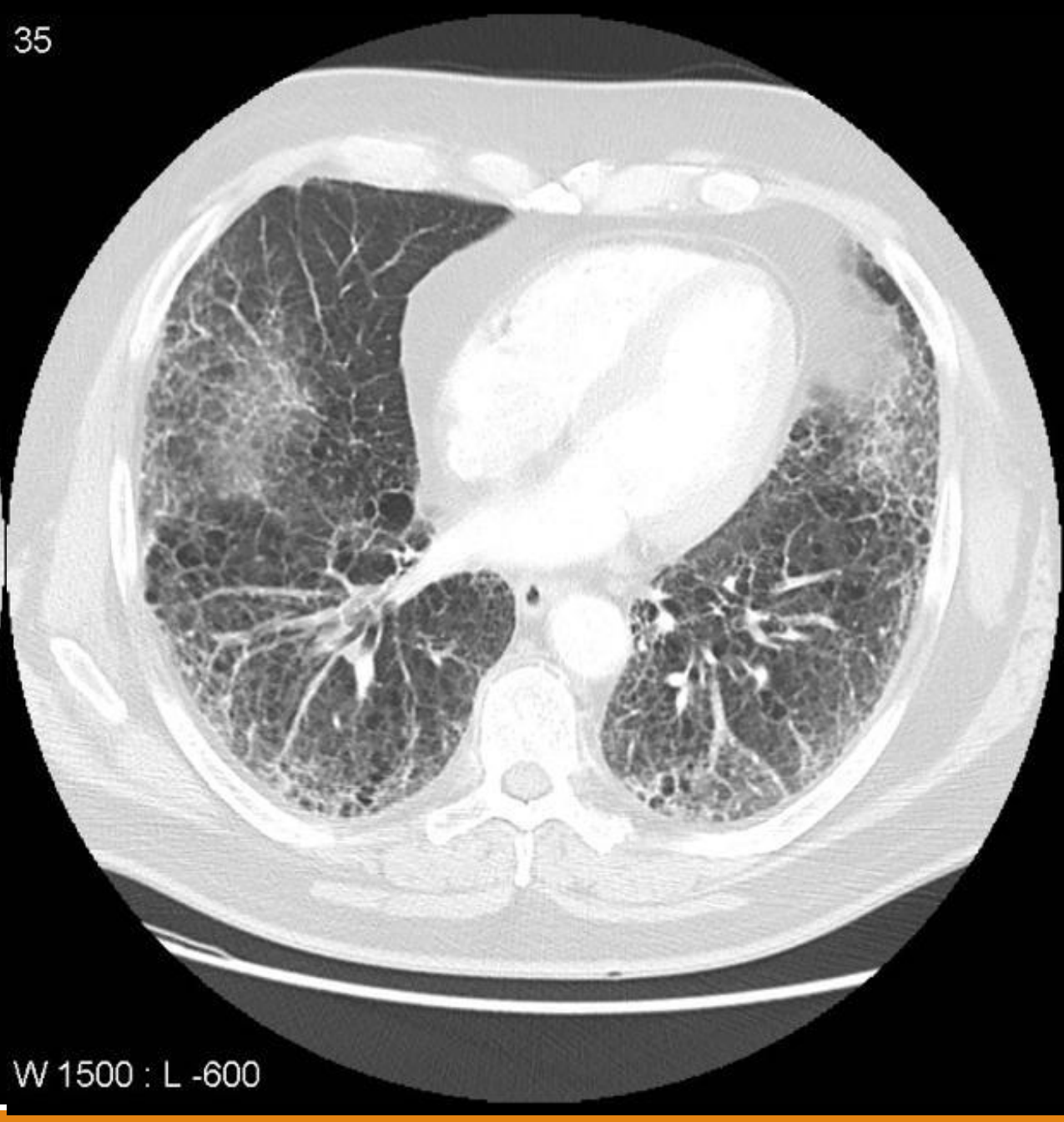
cardiovascular involvement

1. accelerated/premature coronary artery atherosclerosis, contributing significantly to the excess mortality of RA
2. pericarditis

cutaneous involvement

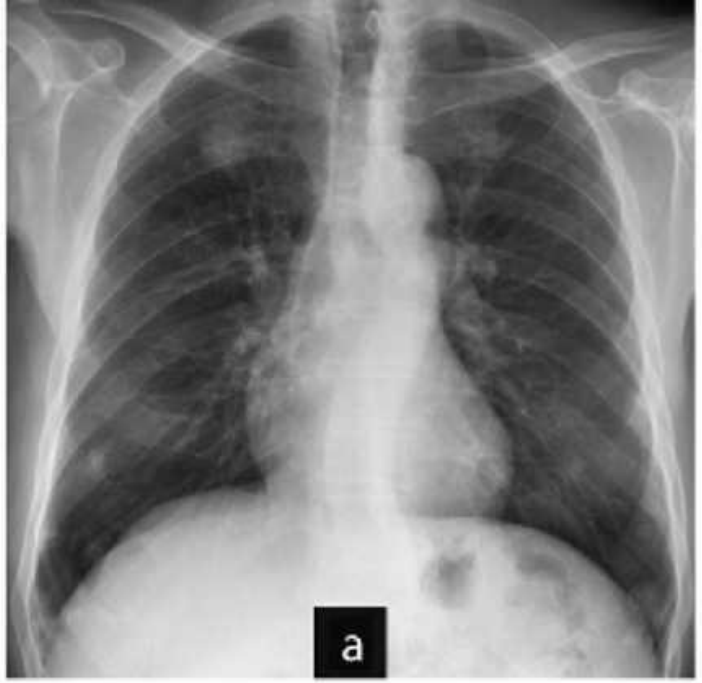
1. rheumatoid nodules: usually seen in pressure areas (e.g. elbows, occiput, lumbosacral) [3] in RF-positive patients
2. rheumatoid vasculitis: classically deep cutaneous ulcers in the lower limbs, may have associated nailfold lesions

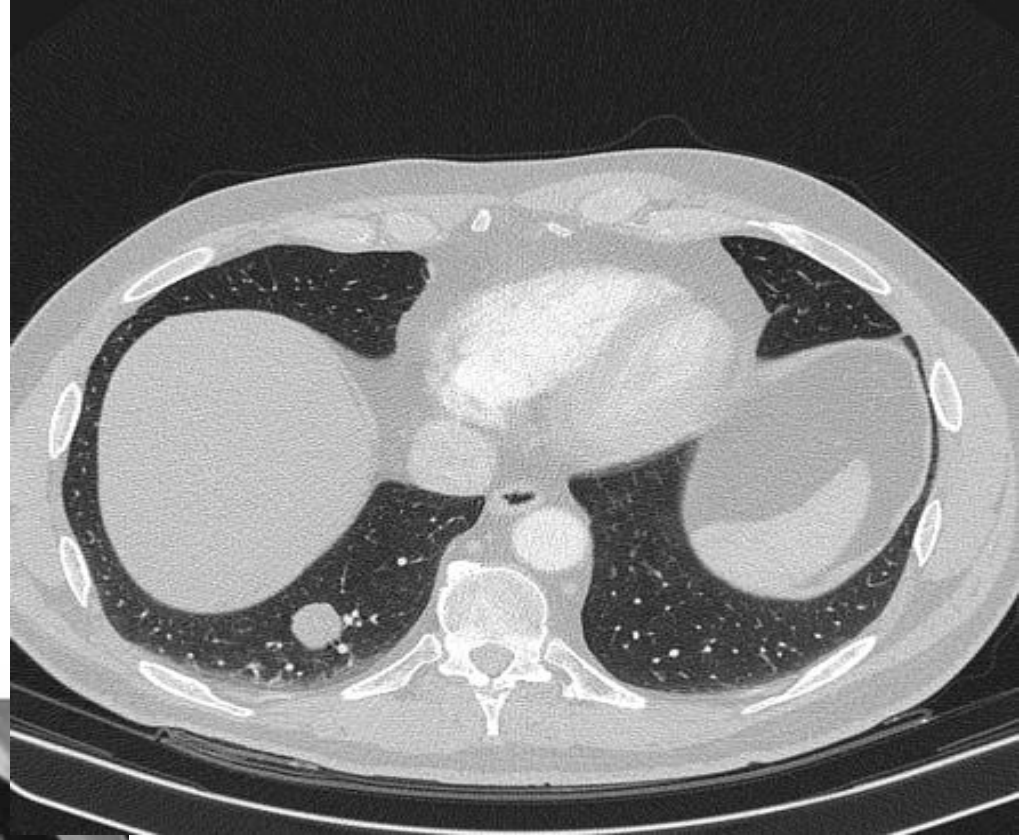


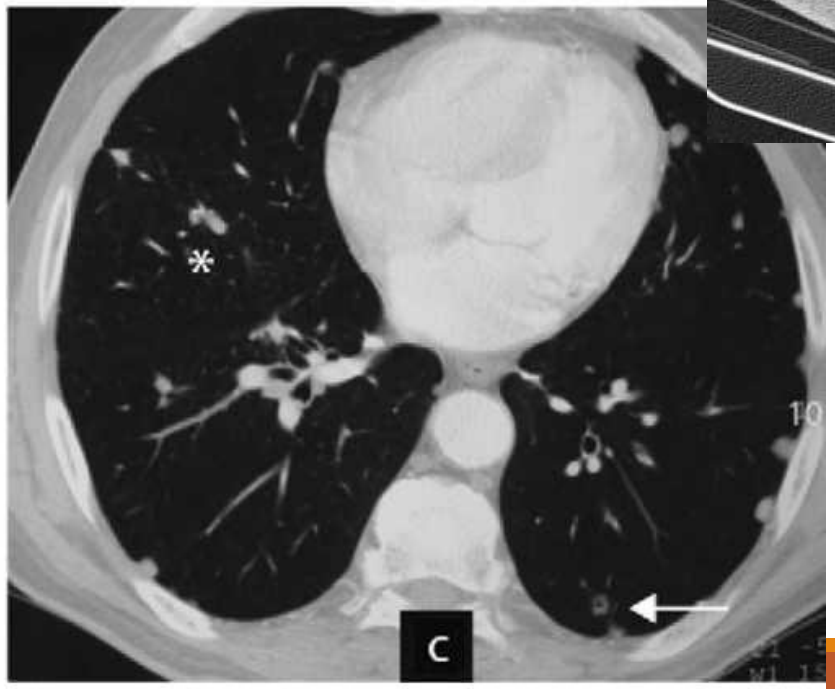


interstitial lung disease

pleural effusion



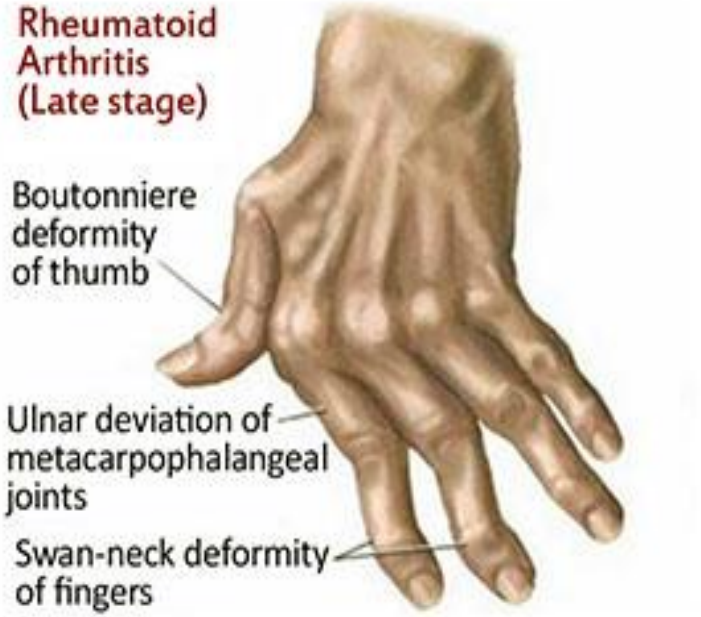


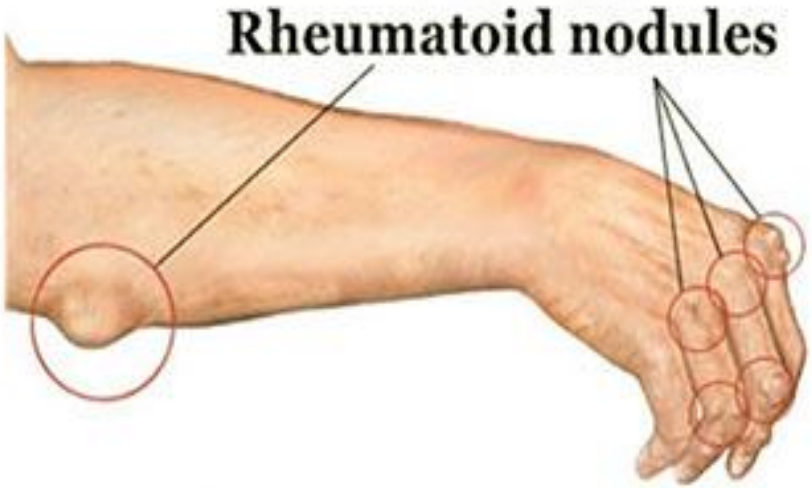


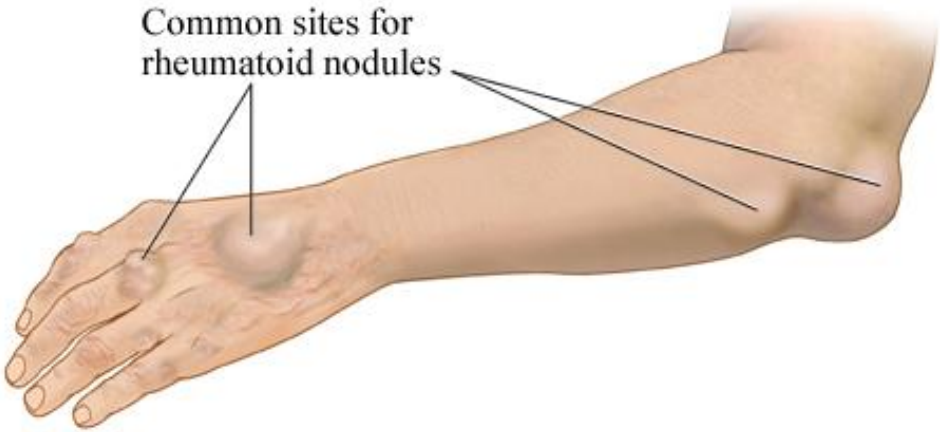
Reumatol Clin. 2012;8:212–5

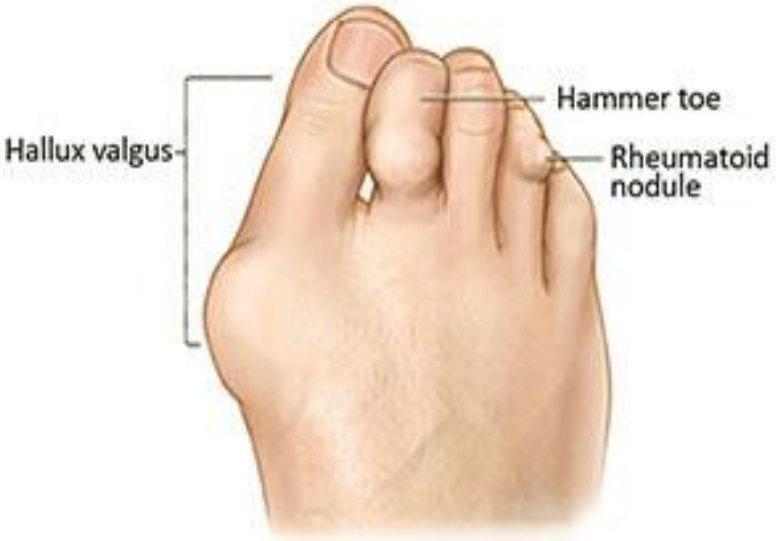
pulmonary nodules

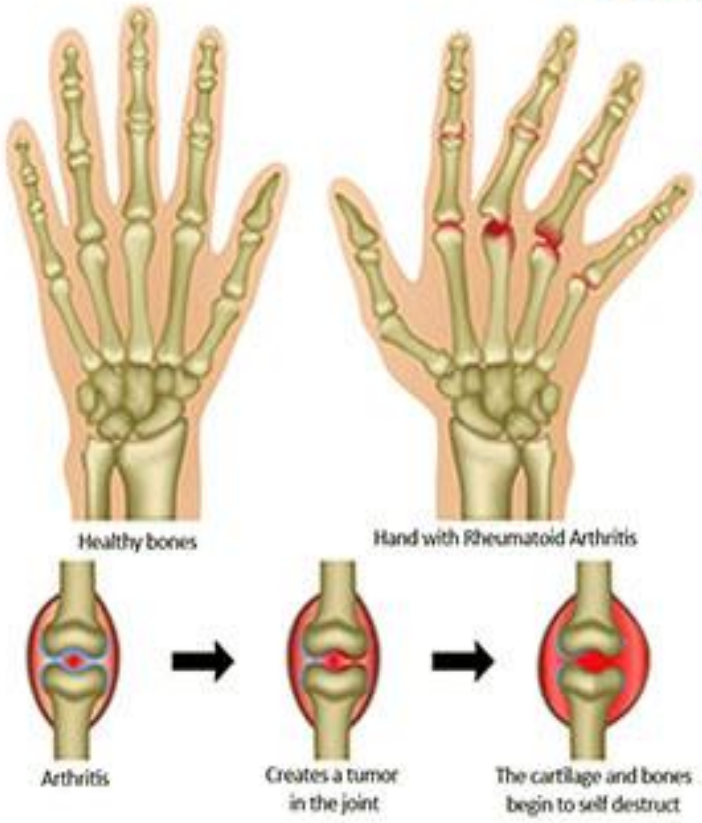
pericarditis


Rheumatoid Arthritis (Late stage)
Boutonniere deformity of thumb
Ulnar deviation of metacarpophalangeal joints
Swan-neck deformity of fingers


Rheumatoid nodules


Common sites for rheumatoid nodules


Hammer toe
Hallux valgus
Rheumatoid nodule


Healthy bones
Hand with Rheumatoid Arthritis
Arthritis
Creates a tumor in the joint
The cartilage and bones begin to self destruct

rheumatoid nodules

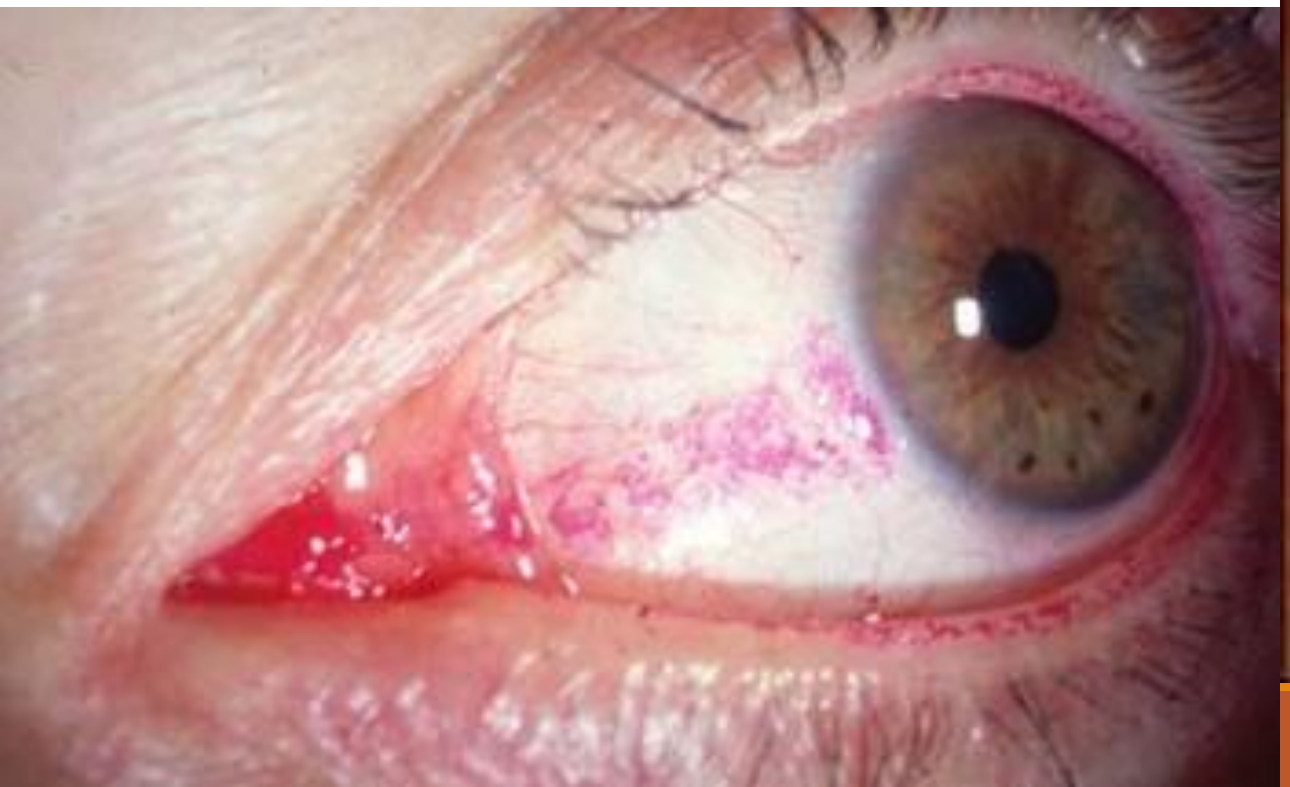
rheumatoid nodules

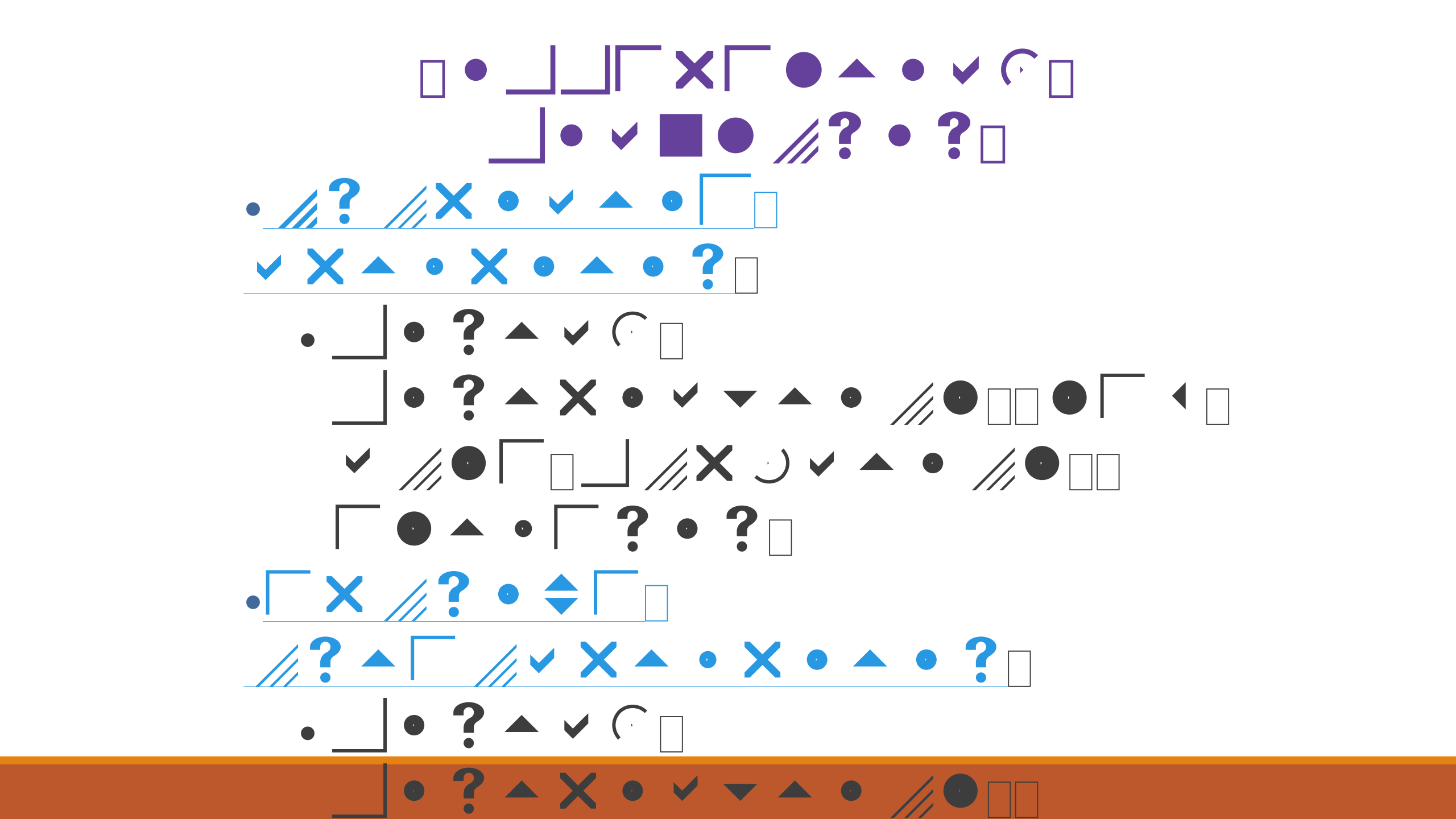
haematological involvement

1. anaemia of chronic disease
2. Felty syndrome: syndrome characterised by the triad of rheumatoid arthritis, splenomegaly, and neutropenia
3. large granular lymphocyte leukaemia

ocular involvement

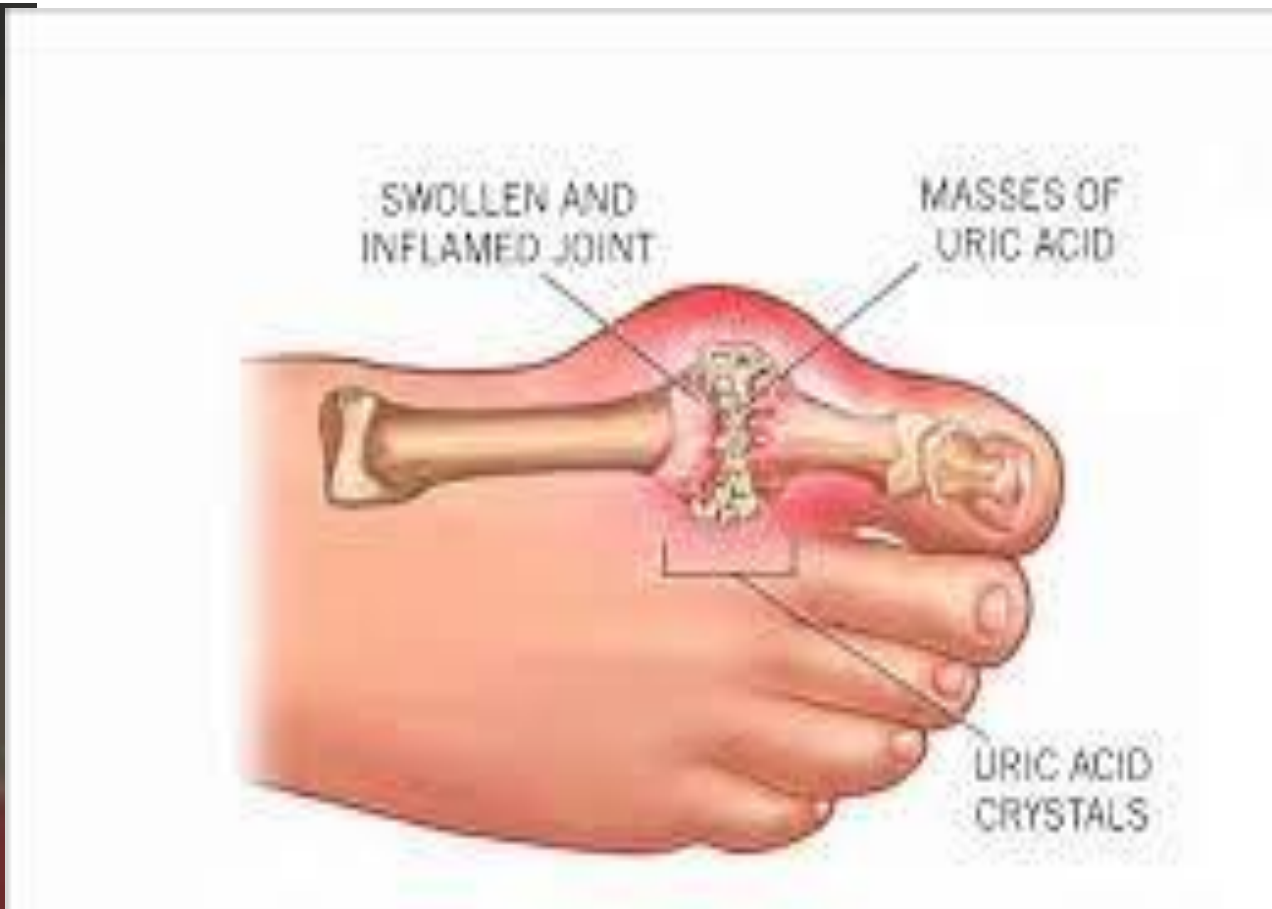
1. keratoconjunctivitis sicca
2. episcleritis





Gout

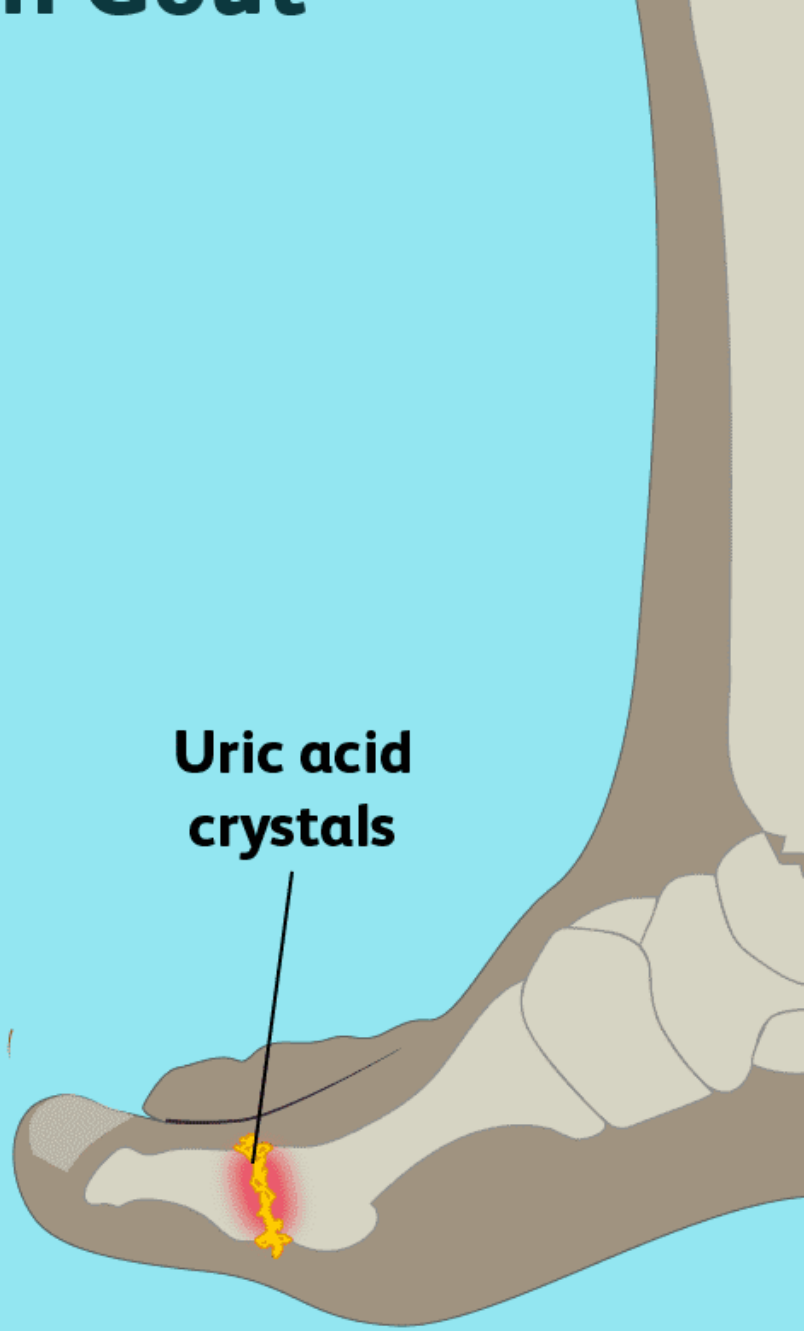
Gout is a crystal arthropathy due to deposition of monosodium urate crystals in and around the joints.



Foods to Eat and Avoid With Gout

Eat

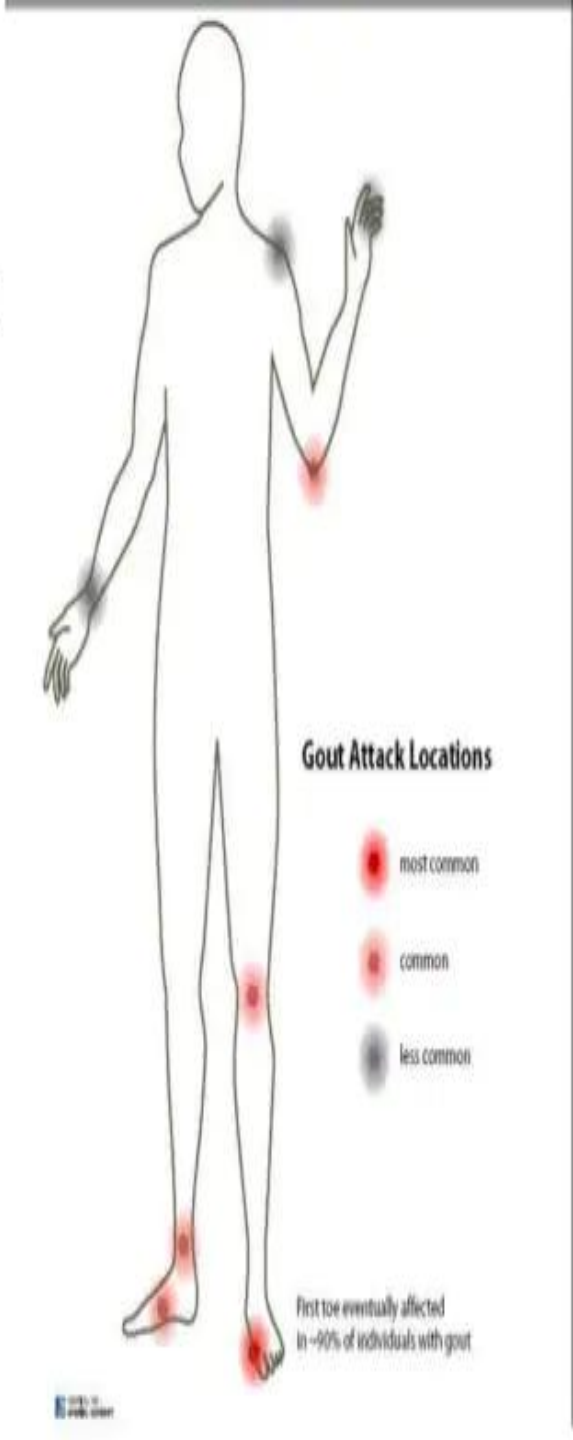
Avoid

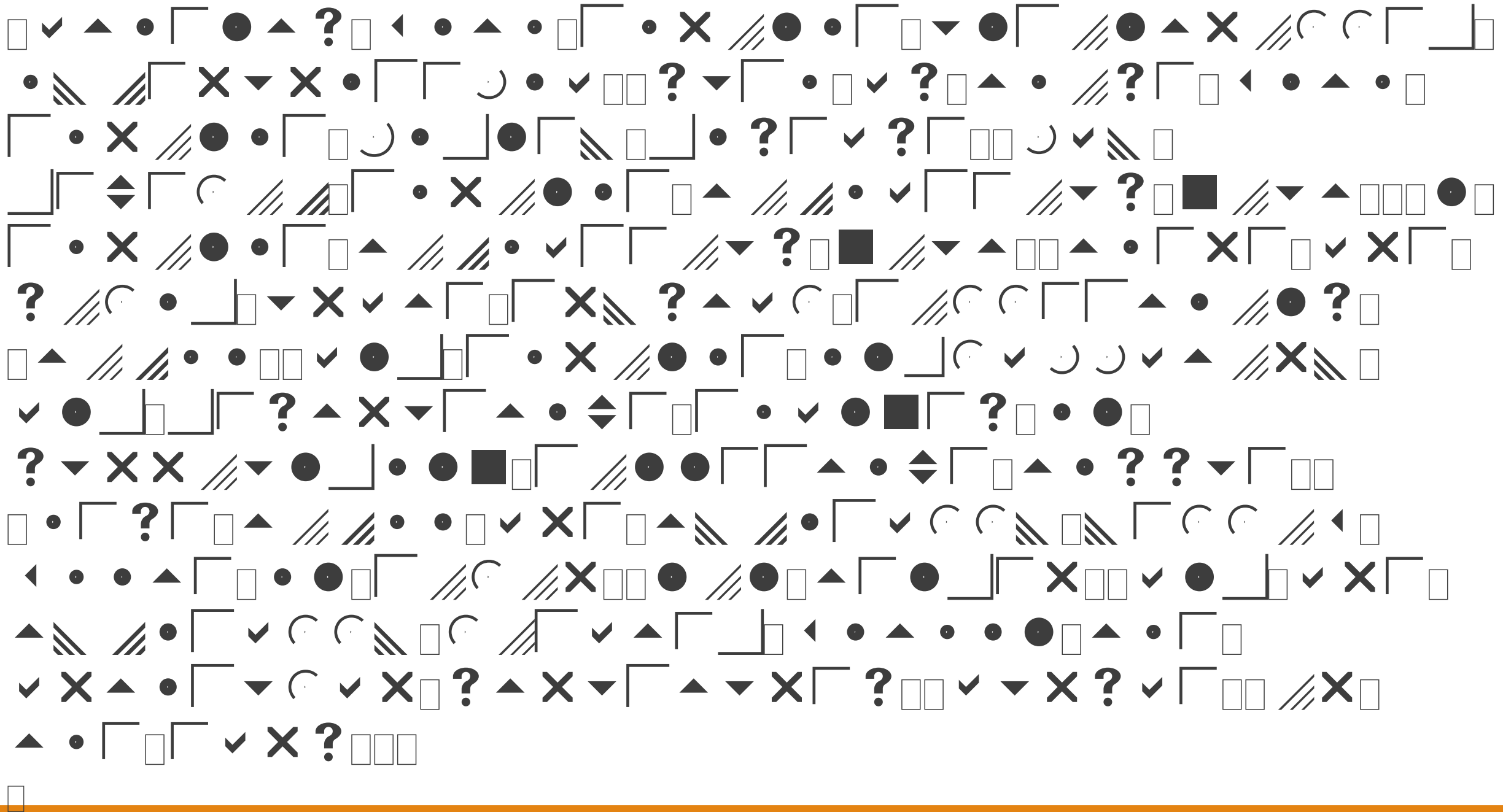


Common sites

Smaller joints:

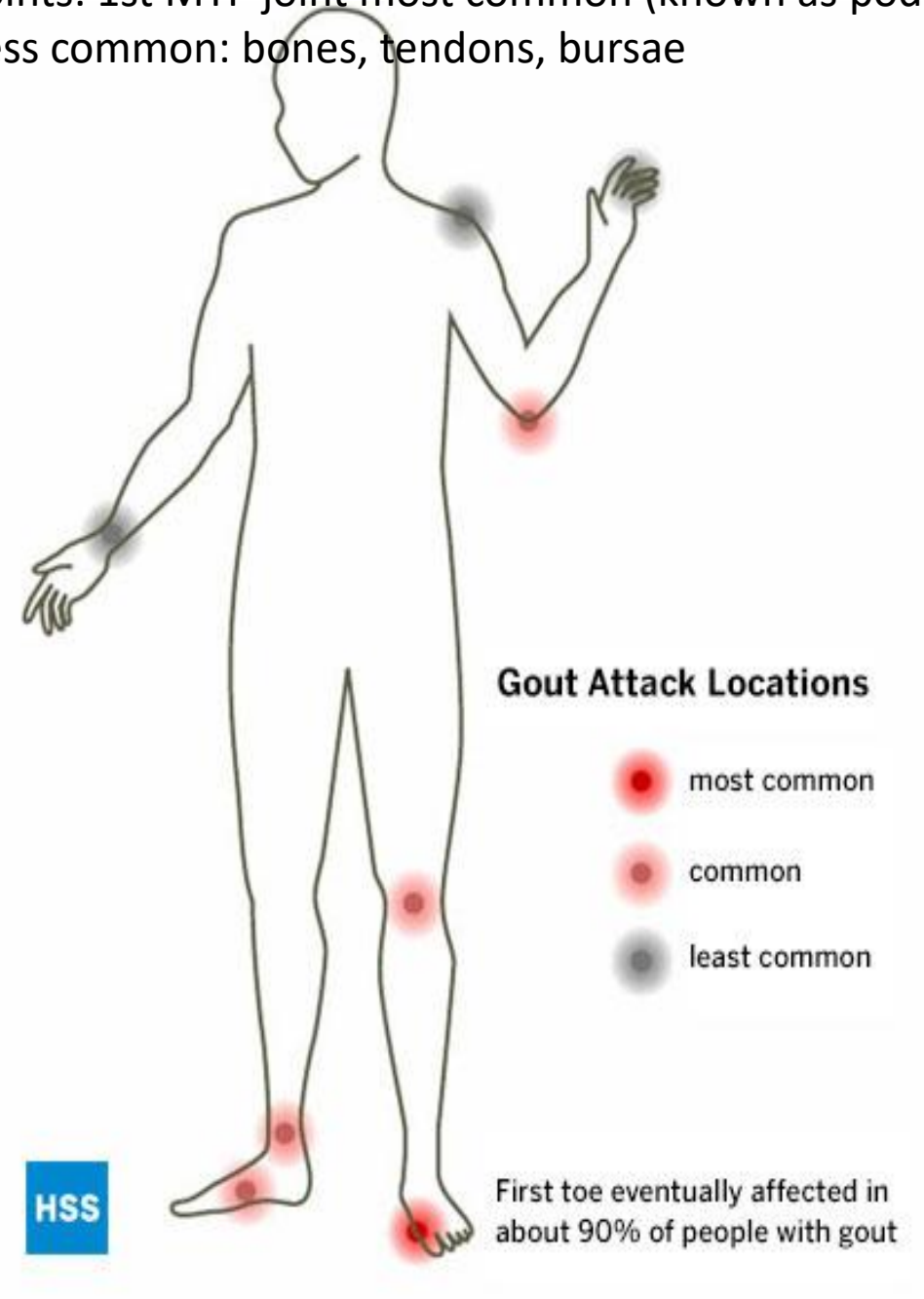
- First metatarsophalyngeal joints
- Interphalyngeal joints of foot
- Interphalyngeal joints of the hands
- Knee joint
- Elbow joint





There are five recognized stages of gout:

Usually, has an asymmetrical polyarticular distribution:
joints: 1st MTP joint most common (known as podagra when it involves this joint); hands and feet are also common
less common: bones, tendons, bursae



Gout

- Erosions
  - Juxtaarticular
  - Overhanging edges
  - Sclerotic margins
- Tophi

Gout

- Alignment

Gout

- Soft tissue
  - Tophi
    - Calcified
    - Non-calcified

Gout

Gout

- Erosions
  - Juxta-articular
  - Sclerotic margins

Gout

- Bone Mineralization
- Normal

Gout

- Cartilage
  - Late joint space loss

First Image Two years later

Figure 1

Figure 2

Joints

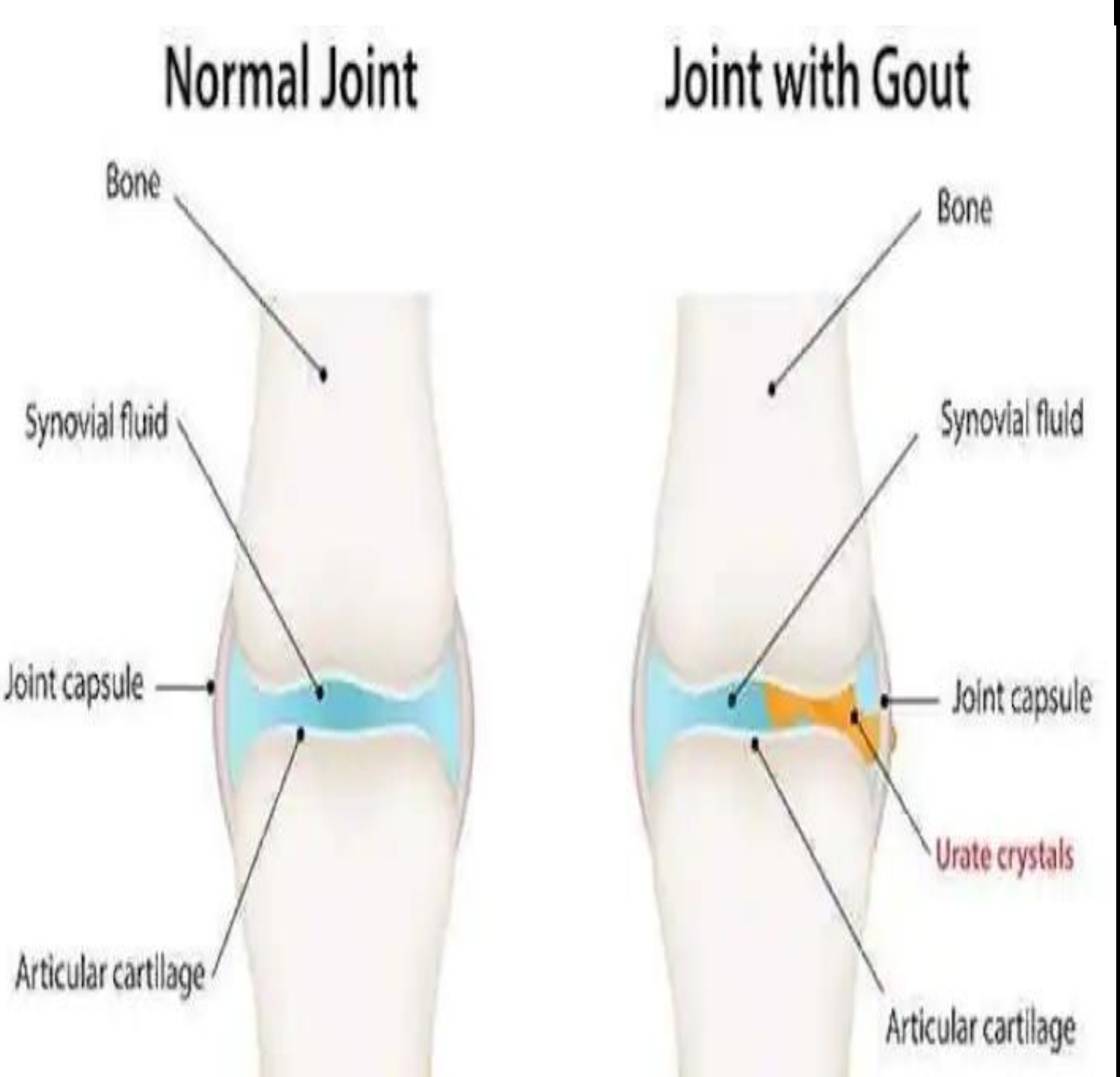
joint effusion (earliest sign)
preservation of joint space until late stages of the disease
an absence of periarticular osteopenia
eccentric erosions
the typical appearance is the presence of well-defined “punched-out” erosions with sclerotic margins in a marginal and juxta-articular distribution, with overhanging edges (see case 12), also known as rat bite erosions

Bone

punched-out lytic bone lesions
overhanging sclerotic margins
osteonecrosis
mineralization is normal

Surrounding soft tissues

tophi: pathognomonic
olecranon and prepatellar bursitis
periarticular soft tissue swelling due to crystal deposition in tophi around the joints is common
the soft tissue swelling may be hyperdense due to the crystals, and the tophi can calcify (uncommon in the absence of renal disease)


Normal Joint
Bone
Synovial fluid
Joint capsule
Articular cartilage
Joint with Gout
Bone
Synovial fluid
Joint capsule
Urate crystals
Articular cartilage


R
YJ
R
YJ

Ultrasound

While there can be variation in appearance, tophi tend to be hyperechoic, heterogeneous, and have poorly defined contours. They can form multiple groups with surrounding anechoic haloes. Additional findings may include:

echogenic, irregular bands apposed to articular cartilage synovial thickening
with increased vascular flow
joint effusions
with dependent hyperechoic, punctate debris
bony cortical discontinuities
associated with adjacent formed tophi

CT

Findings generally reflect those on the plain radiograph.
Dual-energy CT can distinguish between urate mineralization and calcification, which may be useful for cases where the clinical and biochemical presentation is atypical 11. Allowing for not only visualization and characterization, but also quantification of monosodium urate crystal deposits, it can be used for treatment monitoring as well 14.

MRI

Signal characteristics of gouty tophi are usually:
T1: isointense
T2 variable / the majority of lesions are characteristically heterogeneously hypointense
T1 C+ (Gd): tophus often enhances

Osteoarthritis(OA)

Osteoarthritis is the most common type of arthritis. Osteoarthritis is caused by degeneration of cartilage and is also known as degenerative arthritis.

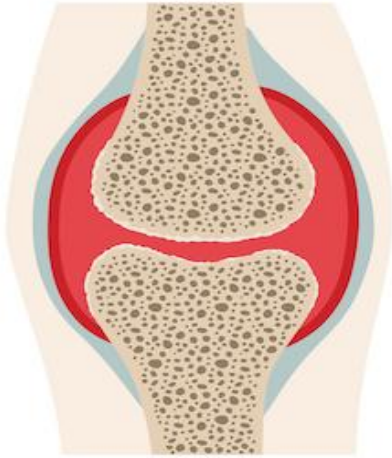
In contrast, rheumatoid arthritis is an autoimmune disorder caused by the immune system attacking the joints. This autoimmune process causes systemic inflammation, while in osteoarthritis, mechanical degeneration causes localized inflammation.

Osteoarthritis commonly affects a single joint, such as one knee. Trauma, such as multiple injuries playing sports, is a risk factor for osteoarthritis.

On the other hand, rheumatoid arthritis usually affects three or more joints, in a symmetric distribution (both wrists, both ankles, and/or the toes on both feet). Rheumatoid arthritis frequently, but not always, causes elevation in blood levels of substances that are markers of systemic inflammation such as the ESR (sed rate or erythrocyte sedimentation rate) and CRP (C-reactive protein).

In contrast, osteoarthritis does not cause abnormal blood test results. Both osteoarthritis and rheumatoid arthritis are hereditary. For example, if a woman (or man) has osteoarthritis or rheumatoid arthritis, her/his children are at increased risk of developing the same type of arthritis.

Rheumatoid arthritis

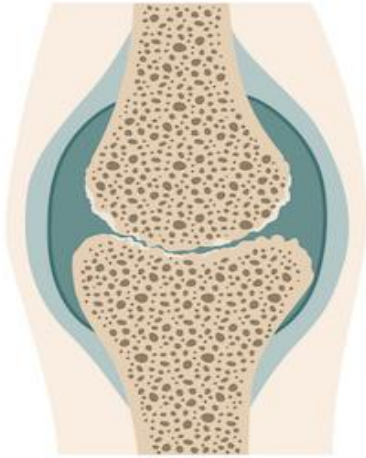


Swollen inflamed synovial membrane

Erosion of bone

Autoimmune disease

Symmetrical



Loss of articular cartilage

Bone's ends rub together

Degenerative disease

Asymmetrical

Osteoarthritis

Symptoms

Pain, stiffness and inflammation

Morning stiffness lasting more than 30 minutes

Pain and stiffness in movement

Morning stiffness lasting less than 30 minutes

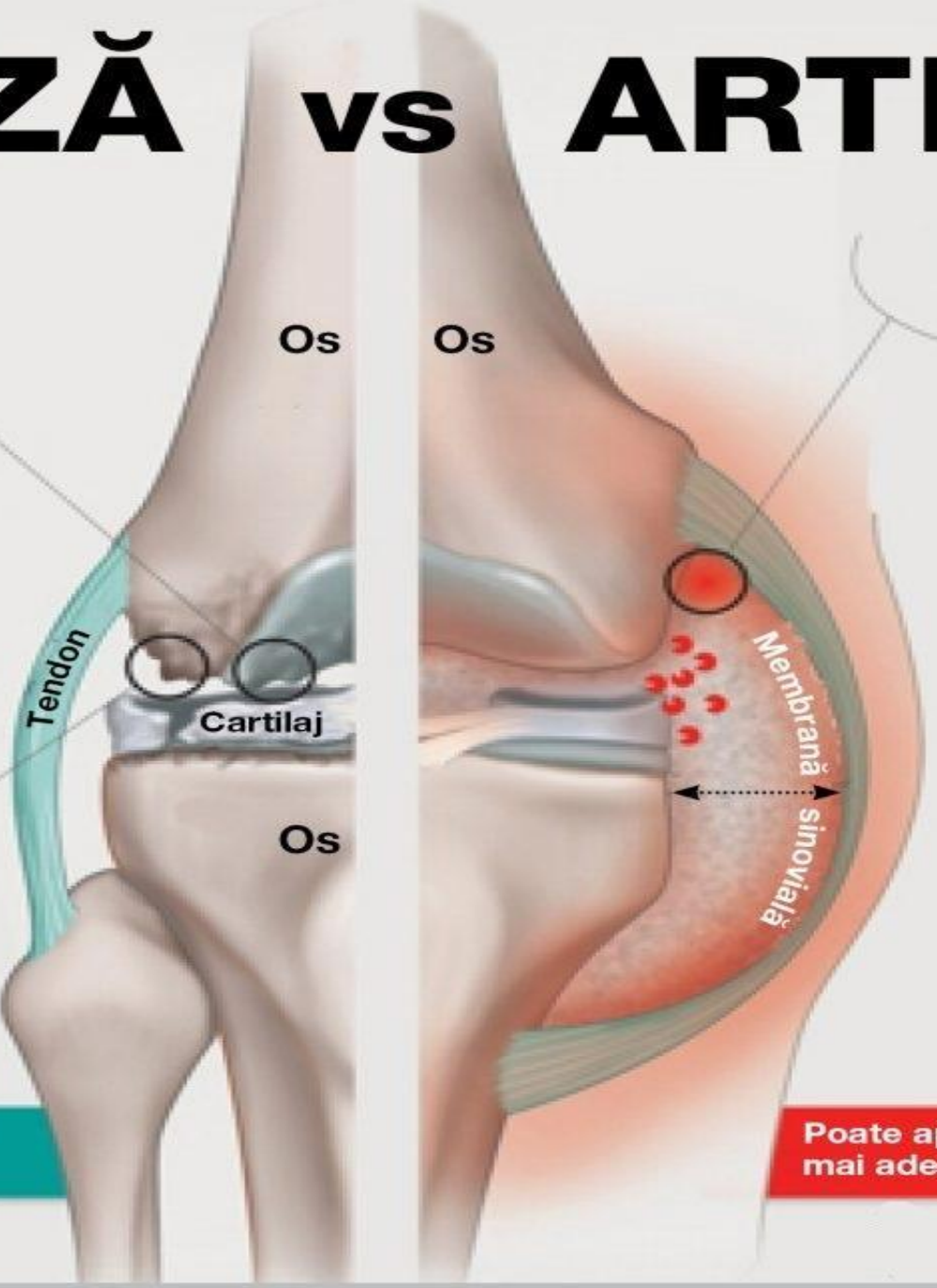
Normal and Arthritic Joints

ARTROZĂ vs ARTRITĂ

1. Cartilajul articular se deteriorează, din cauze mecanice (efort fizic intens, reducerea masei musculare) sau genetice.

2. Nu își mai îndeplinește rolul de a asigura flexibilitate și mobilitate articulară.

3. Contactul os pe os provoacă dureri, rigiditate și deformări articulare.



1. Inflamația se declanșează în membrana sinovială care căptușește interiorul articulației.

2. Această agresiune antrenează umflarea articulației, din cauza producției crescute de lichid sinovial.

3. Eliberarea de substanțe (enzime) care distrug cartilajul și uneori oasele și tendoanele.

Apare frecvent la persoane în vârstă și/sau afectate de obezitate.

Poate apărea la orice vârstă, dar cel mai adesea în jur de 50 de ani.

Pathology

The pathogenesis and pathophysiology of OA are yet to be fully understood. Despite emphasis being placed on articular cartilage degeneration, the remainder of the joint is involved including bone remodeling, osteophyte formation, ligamentous laxity, periarticular muscle weakness, and synovitis

Clinical presentation

Patients present with decreased function from joint pain, instability, and stiffness. The pain is typically worsened by activity and decreases at rest; in later disease stages, it may become continuous. Many cases of radiological OA are asymptomatic and conversely clinically apparent OA may not manifest radiographic change.

Classification

Osteoarthritis can be :

primary (idiopathic)

- absence of an antecedent insult
- strong genetic component with the disease primarily affecting middle-aged women

secondary

- abnormal mechanical forces (e.g. occupational stress, obesity)
- previous joint injury
  - post-traumatic osteoarthritis
    - accounts for ~12% of all OA [1]major cause in young adults
  - prior surgery
  - crystal deposition (e.g. gout, CPPD)
  - inflammatory arthritis (e.g. rheumatoid arthritis, seronegative spondyloarthritis)
  - hemochromatosis

Distribution

OA can affect both the axial and appendicular skeleton. The most common peripheral joints affected include [ref]:

Hands, knee, hip

Kellgren-Lawrence (KL)grading system

Grade 0	Normal
Grade 1	Doubtful narrowing of joint space and possible osteophytic lipping
Grade 2	Definite osteophytes and possible narrowing of joint space
Grade 3	Moderate multiple osteophytes, definite narrowing of joint space and some sclerosis, and possible deformity of bone ends
Grade 4	Large osteophytes, marked narrowing of joint space, severe sclerosis, and definite deformity of bone ends

joint space narrowing

characteristically asymmetric
least specific: present in many other pathological processes

subchondral sclerosis

sclerotic changes occur at joint margins
frequently seen unless severe osteoporosis is present

osteophytosis

i.e. development of osteophytes
common degenerative joint disease finding
will also be diminished in the setting of osteoporosis
some osteophytes carry eponymous names, e.g. Heberden nodes, Bouchard nodes

joint erosions

several joints may exhibit degenerative erosions :
temporomandibular joint
acromioclavicular joint
sacroiliac joints
symphysis pubis

subchondral cysts

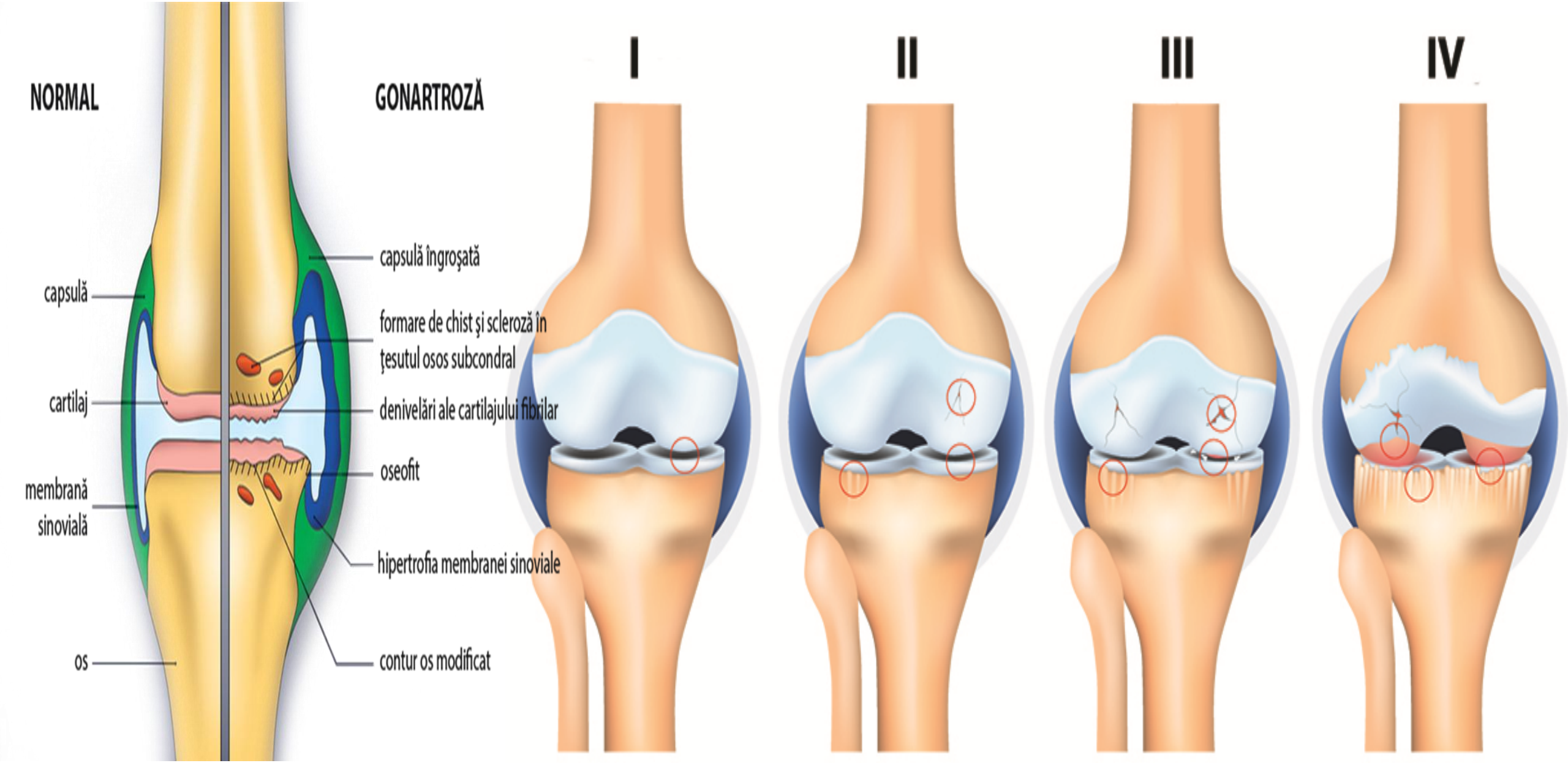
also known as geodes
cystic formations that occur around joints in a variety of disorders, including, rheumatoid arthritis, calcium pyrophosphate dihydrate crystal deposition disease (CPPD), and avascular necrosis

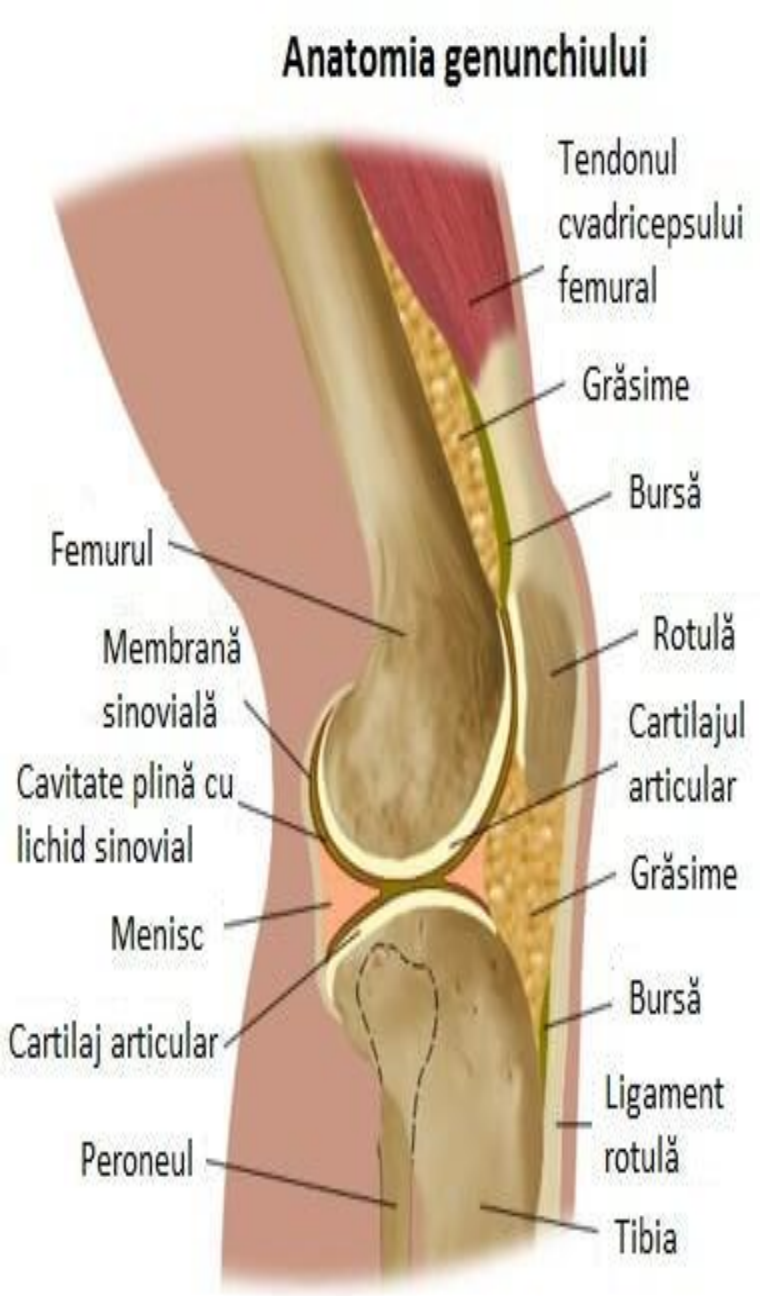
bone marrow lesions (BML)

visible on MRI as bone marrow edema-like lesions, often adjacent to areas of cartilage damage - likely representing early OA changes
have been shown to correlate with joint pain and progression of cartilage loss
may progress to subchondral cysts

synovitis

a non-specific finding, present also in other diseases, including inflammatory and infectious conditions
present in up to 50% of the patients with OA according to some authors it may be correlated with pain, disease severity and progression


NORMAL
GONARTROZĂ
capsulă
cartilaj
membrană sinovială
os
capsulă îngroşată
formare de chist şi scleroză în ţesutul osos subcondral
denivelări ale cartilajului fibrilar
oseofit
hipertrofia membranei sinoviale
contur os modificat
I
II
III
IV


Anatomia genunchiului
Tendonul cvadricepsului femural
Grăsime
Bursă
Femurul
Rotulă
Membrană sinovială
Cartilajul articular
Cavitate plină cu lichid sinovial
Grăsime
Menisc
Bursă
Cartilaj articular
Ligament rotulă
Peroneul
Tibia


Articulaţie normală
Os
Capsulă articulară
Membrană sinovială
Lichid sinovial
Cartilaj

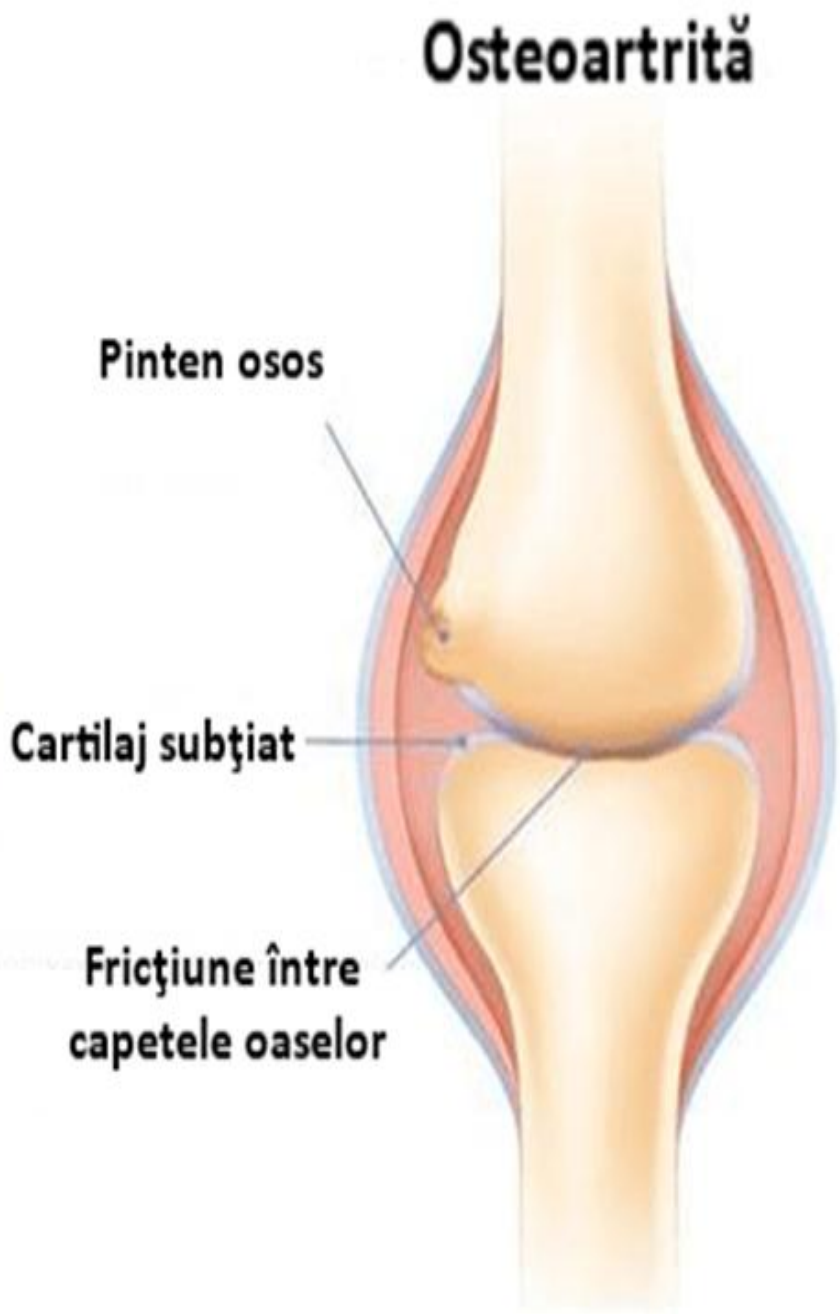
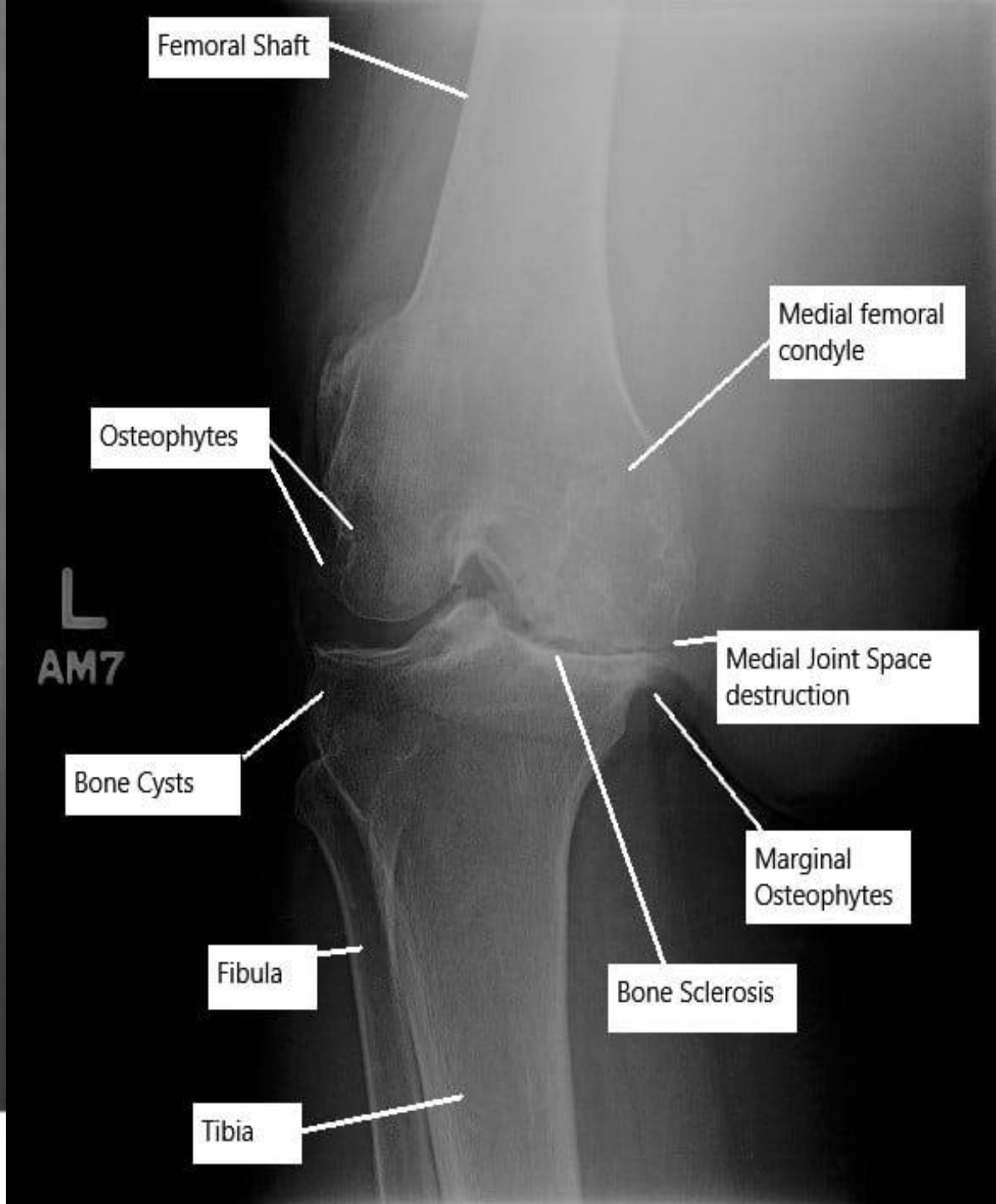
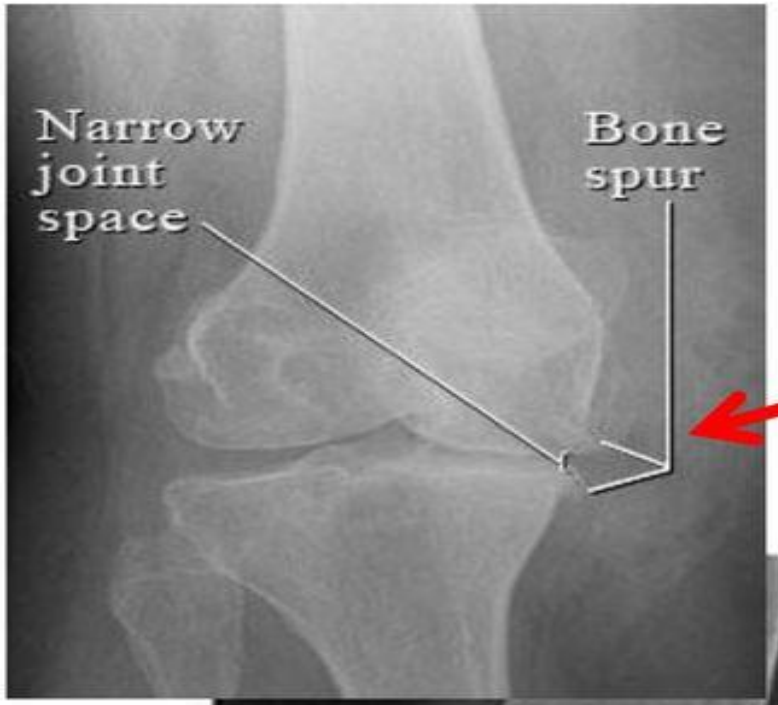

Osteoartrită
Pinten osos
Cartilaj subţiat
Fricţiune între capetele oaselor

Figure 1

Figure 2



NORMAL KNEE



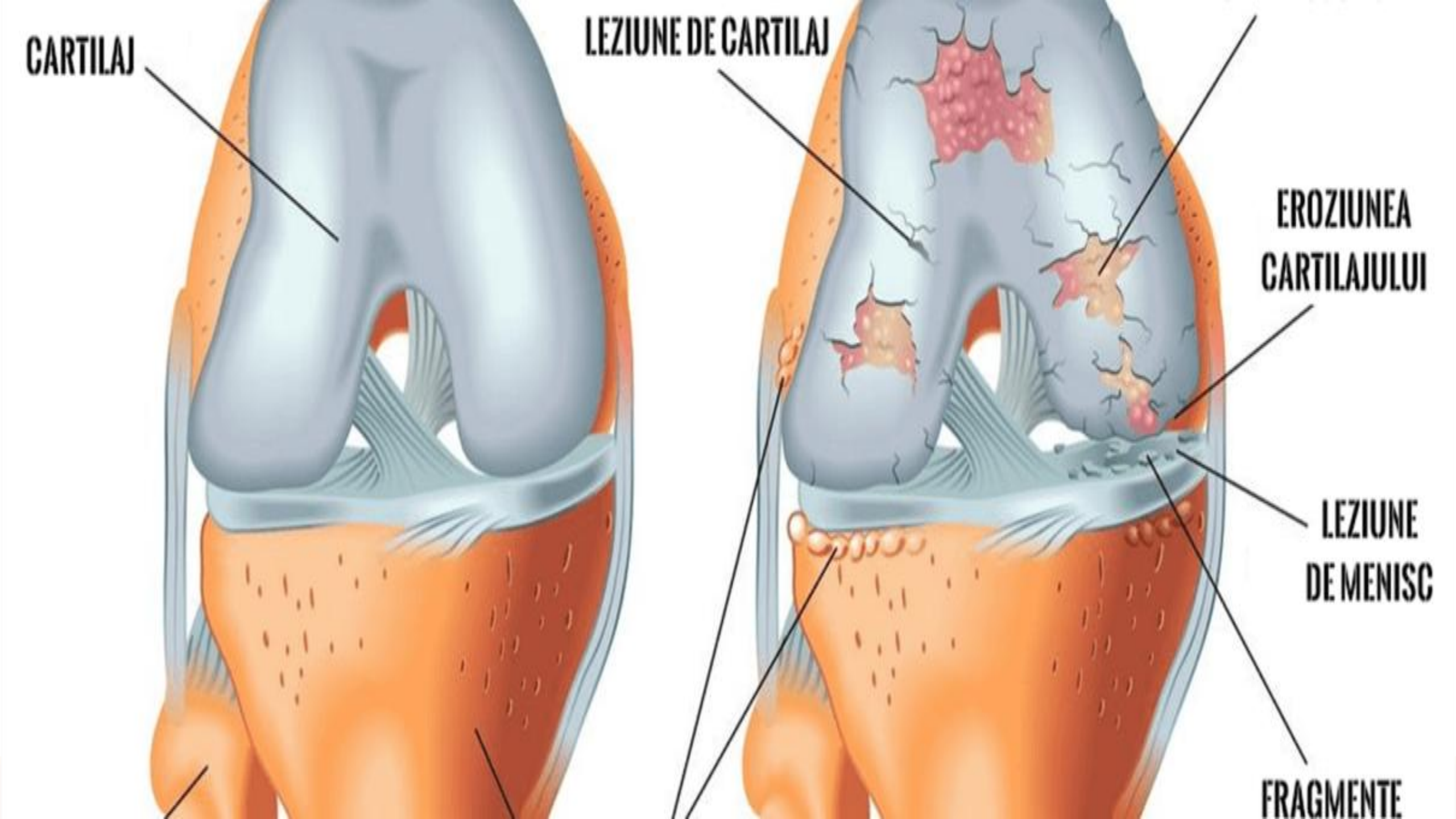
OA:

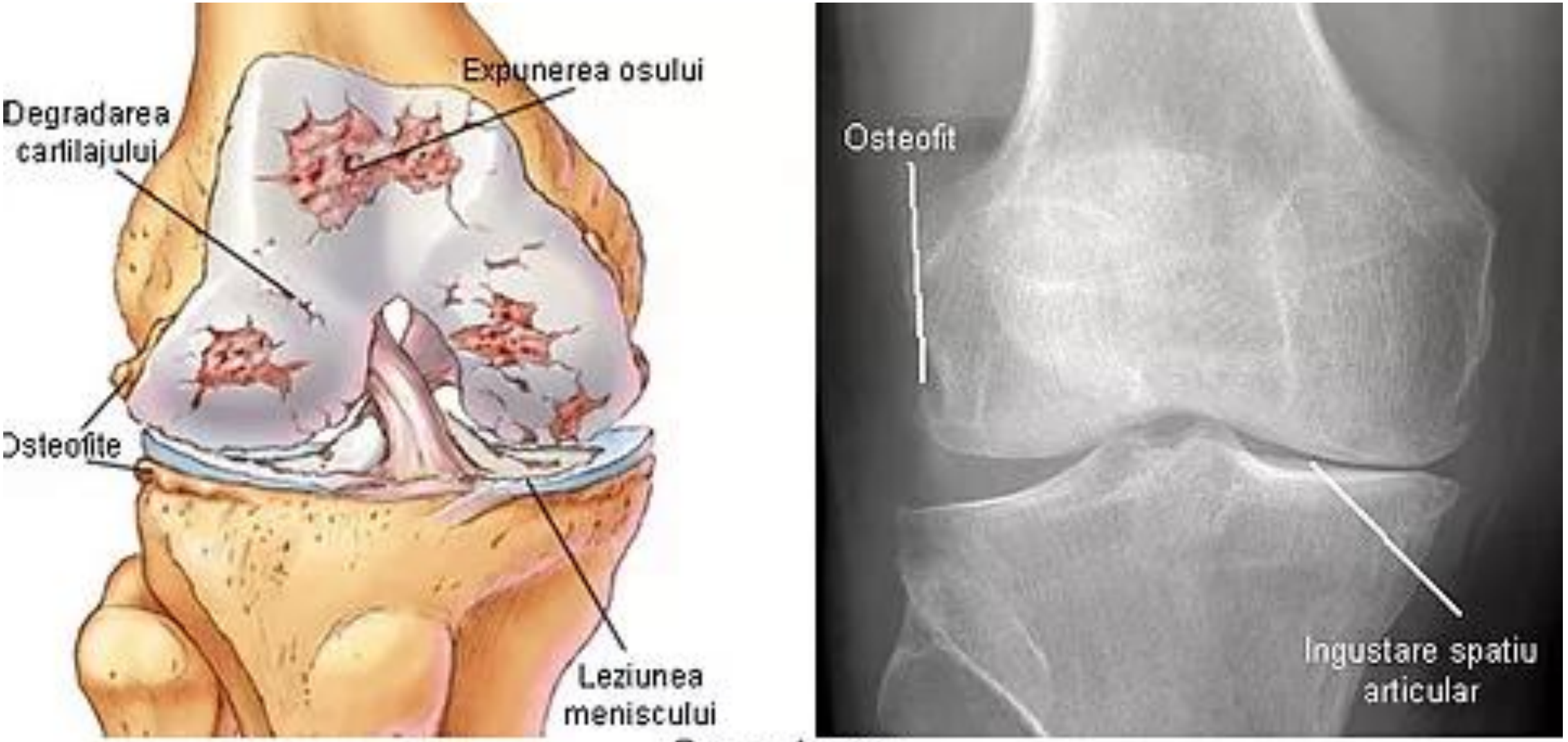
asymmetrical narrowing

JIA/RA:

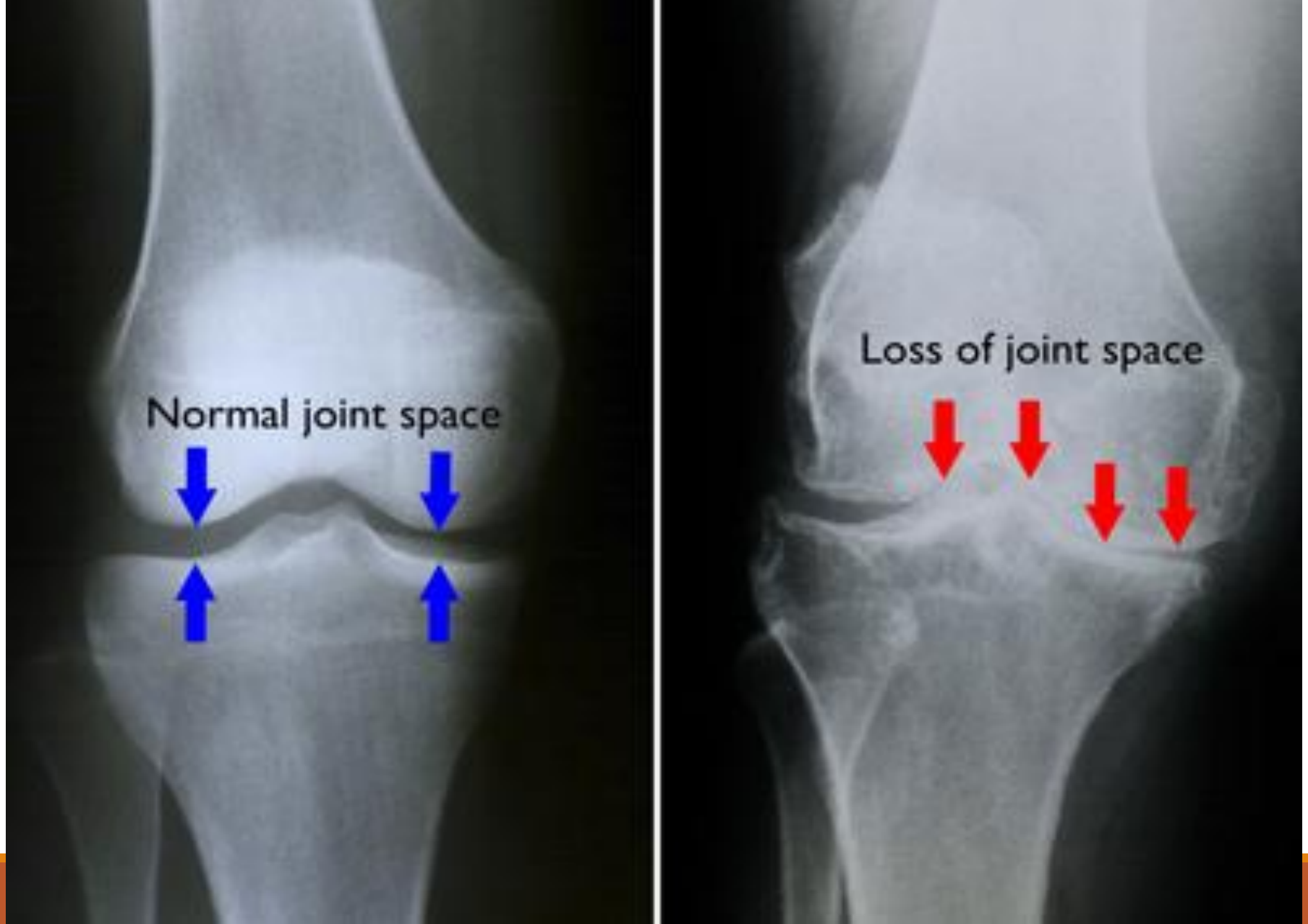
Symmetrical narrowing

X-rays of two knees illustrating (left) rheumatoid arthritis and (right) degenerative osteoarthritis


CARTILAJ
LEZIUNE DE CARTILAJ
EROZIUNEA CARTILAJULUI
LEZIUNE DE MENISC
FRAGMENTE


Expunerea osului
Degradarea cartilajului
Osteofite
Leziunea meniscului
Osteofit
Ingustare spatiu articular

Gonartroza


Normal joint space
Loss of joint space

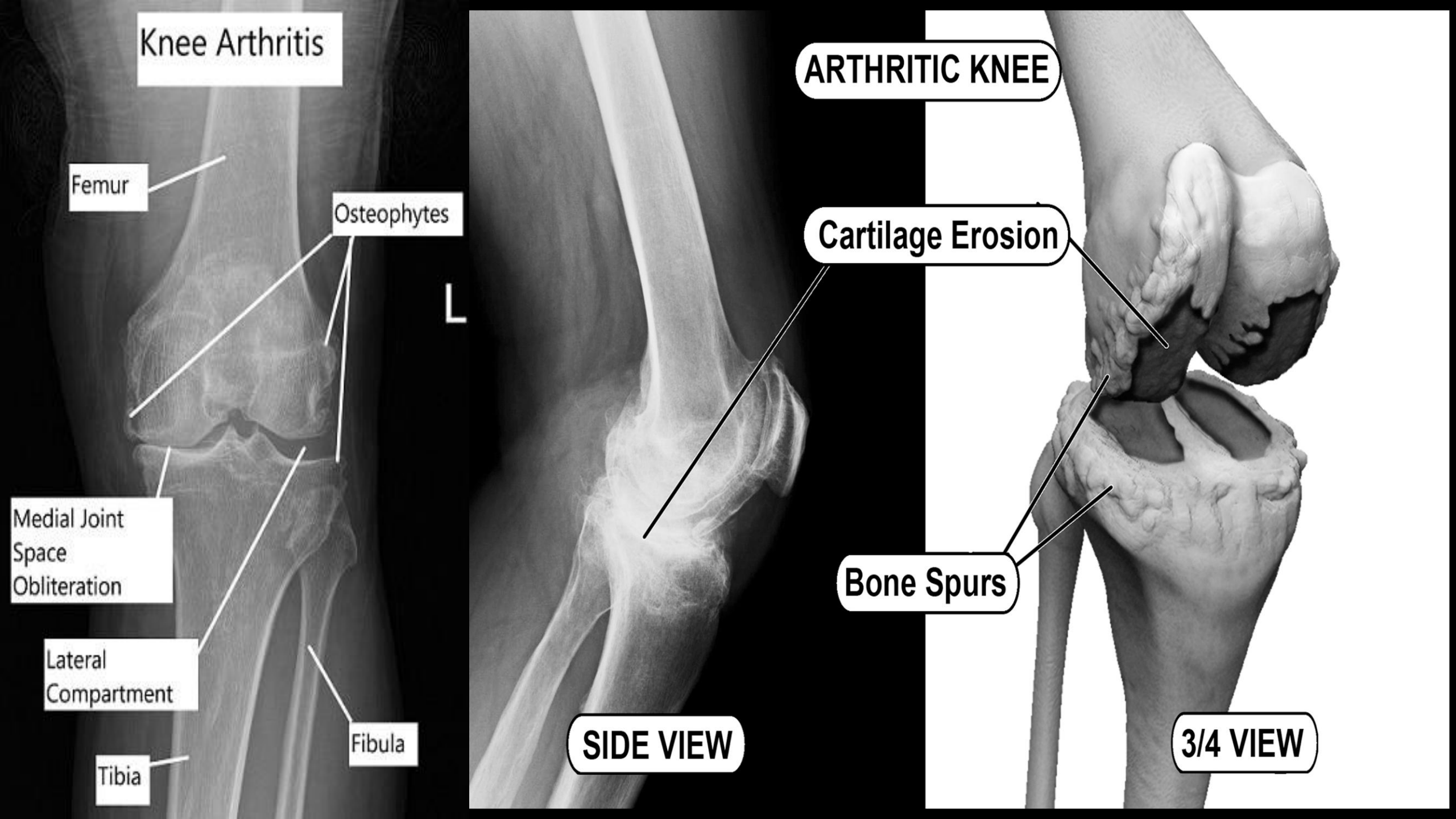

Knee Arthritis
Femur
Osteophytes
L
Medial Joint Space Obliteration
Lateral Compartment
Fibula
Tibia
SIDE VIEW
ARTHRITIC KNEE
Cartilage Erosion
Bone Spurs
3/4 VIEW

Figure 1

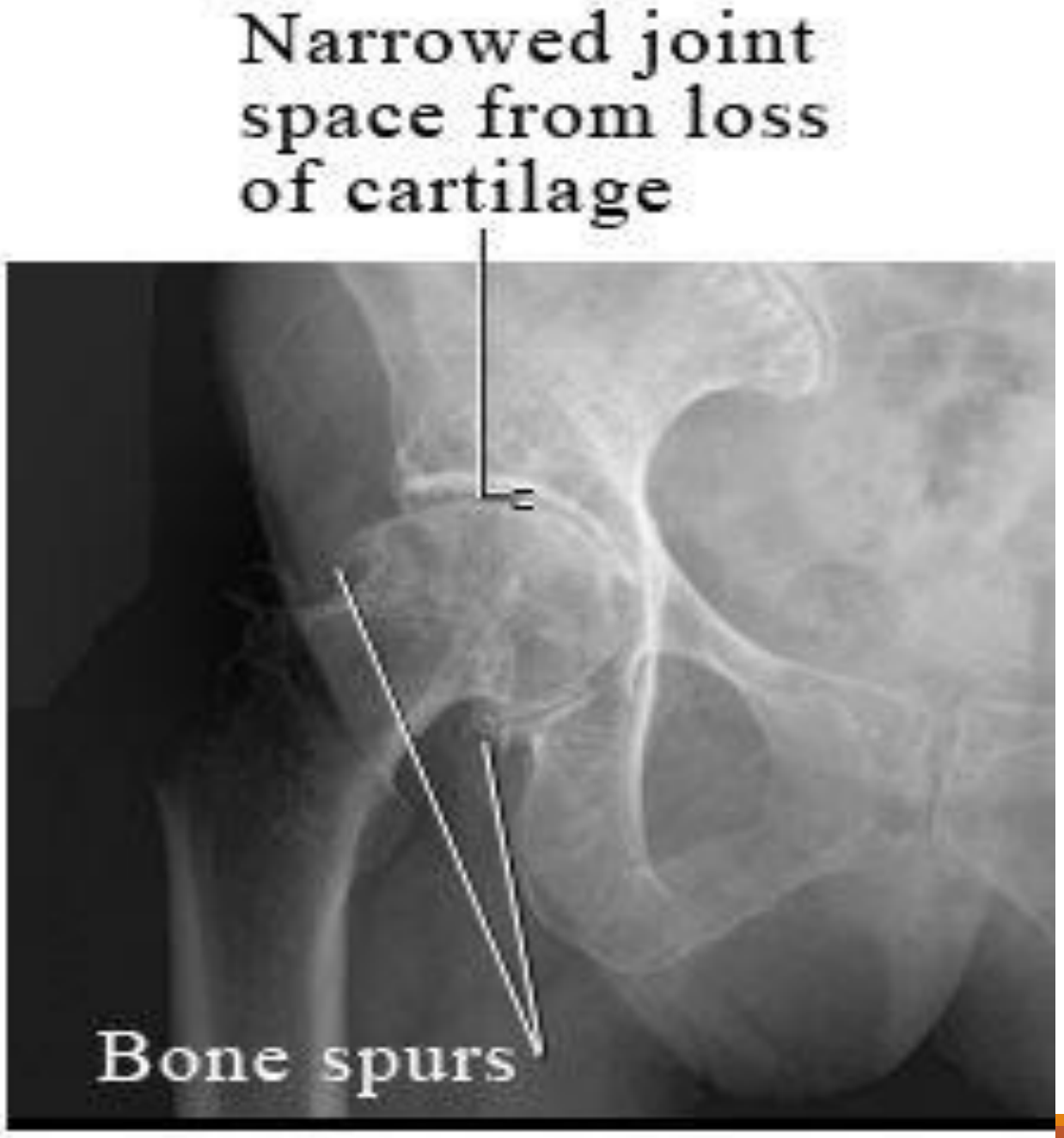
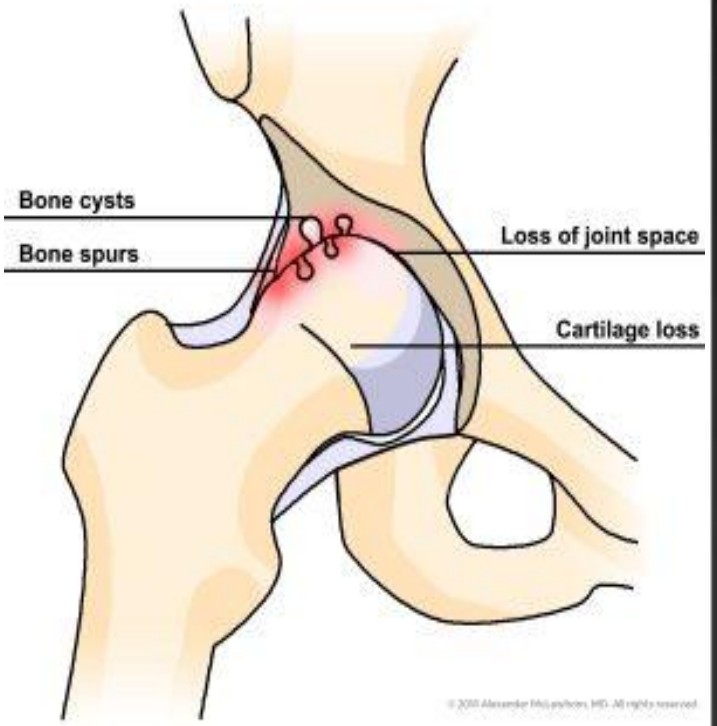


Figure 2



Arthritic Hip

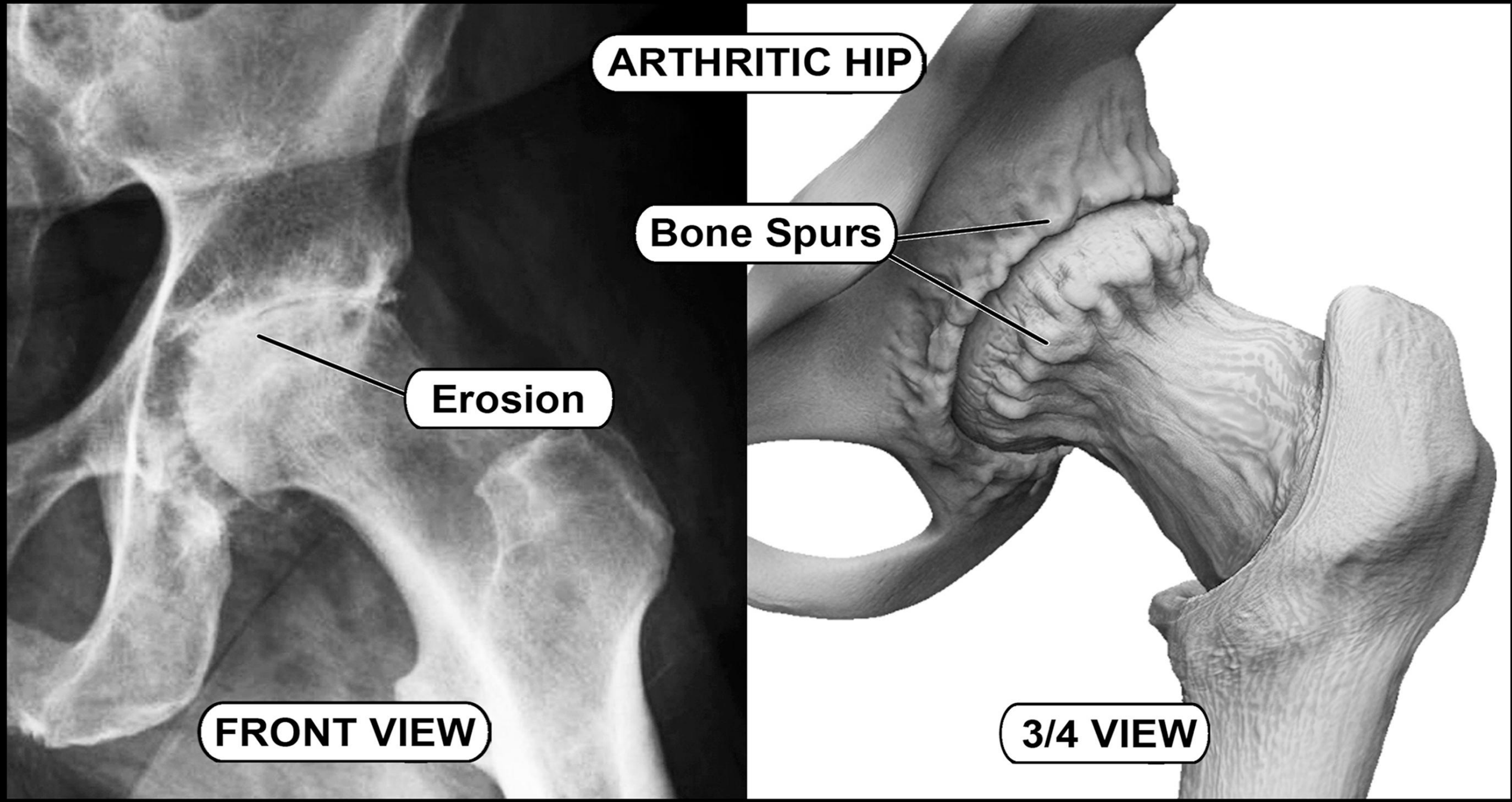
Normal Hip

No joint space (bone on bone)

Cysts noted in bone of femur head

Sclerosis or hardening of the bone (looks more white)

Joint space can be seen


ARTHRITIC HIP
Bone Spurs
Erosion
FRONT VIEW
3/4 VIEW


A
B

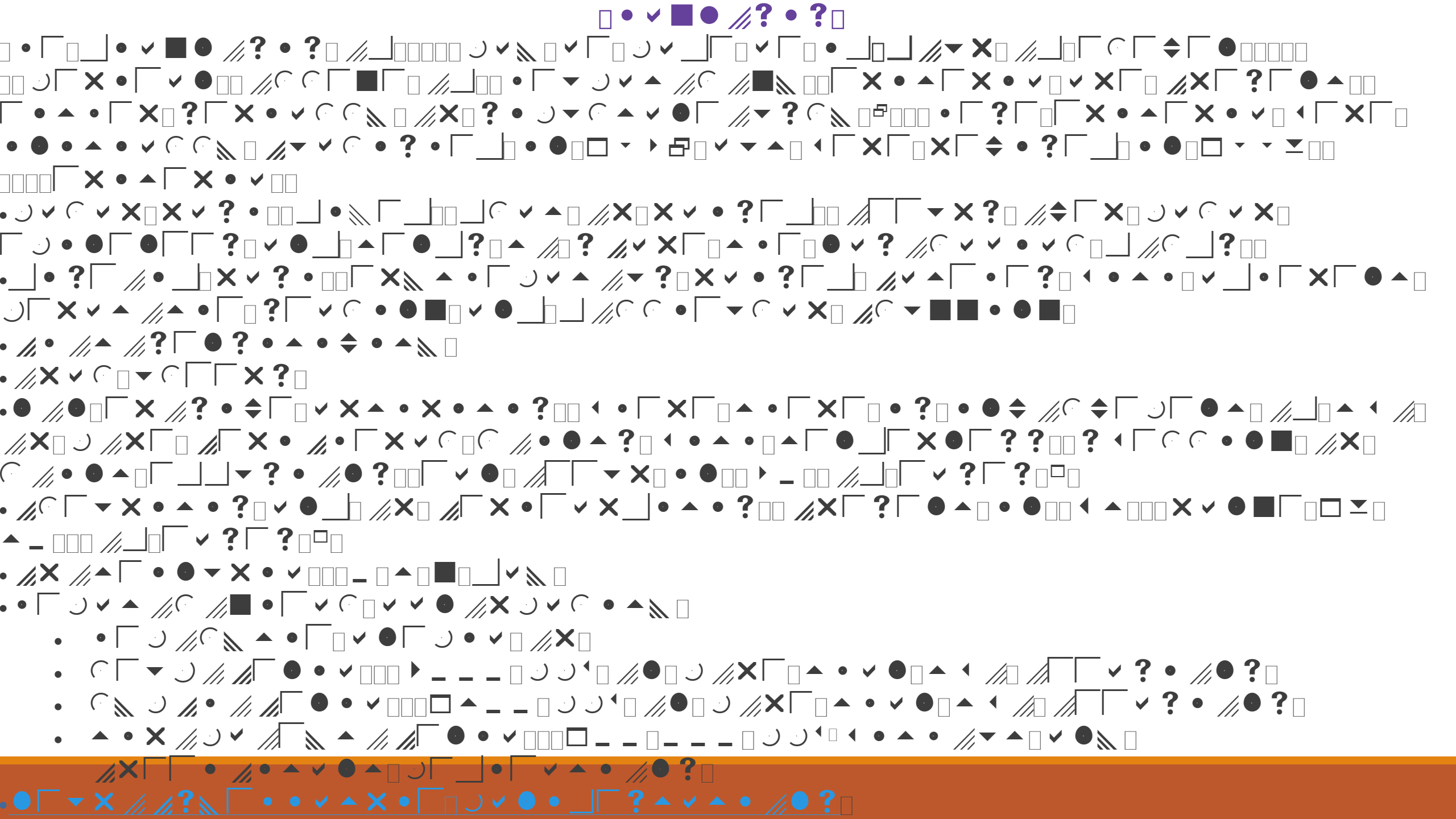
Systemic lupus erythematosus

(**SLE**) is a complex autoimmune disease with multisystem involvement. Although abnormalities in almost every aspect of the immune system have been found, the key defect is thought to result from a loss of self-tolerance to autoantigens.

There is a strong female predilection in adults, with women affected 9-13 times more than males. In children, this ratio is reversed, and males are affected two to three times more often.
While it can affect any age group, the peak age at onset around the 2nd to 4th decades, with 65% of patients presenting between the ages of 16 and 65 years (i.e. during childbearing years). The disease is sometimes classified according to early and late-onset groups

Clinical picture

Symmetric polyarthritis
Seen in 75-90% of patients with varying degrees of severity, it represents the most common presenting complaint clinically, usually worse in the morning. Areas of involvement most commonly include the small joints of the hand, knees, wrists, and shoulders.
Deforming non-erosive arthropathy
When articular abnormalities are present, approximately 5-40% will develop a deforming non-erosive arthropathy due to ligamentous laxity (not articular destruction) and muscle contracture. This is more common in those with long-standing disease. In the hands, this can be classically seen on Nørgaard views but absent on PA views and are termed as reducible deformities. The presence of deformities without erosions can differentiate from rheumatoid arthritis.
Due to their frequently reducible nature, deformities are seldom disabling.



Plain radiograph

Plain radiographs demonstrate soft tissue swelling of the involved joints, periarticular osteoporosis, and normal joint spaces. Carpal instability may be seen in 15% of patients 2.

Hands and feet

Symmetric involvement of interphalangeal joints is most common, showing swan neck and boutonniere deformities, subluxation with ulnar deviation at MCP joints, subluxation of the 1st metacarpophalangeal joint, a widened forefoot, and hallux valgus.

Joint space narrowing is uncommon, and when present is likely due to disuse atrophy or pressure from an adjacent subluxed bone. Altered stresses across the joint may also cause a "hook erosion" at the metacarpal heads due to capsular stress, mimicking findings of rheumatoid arthritis. This is more often observed on the radial side.

Spine

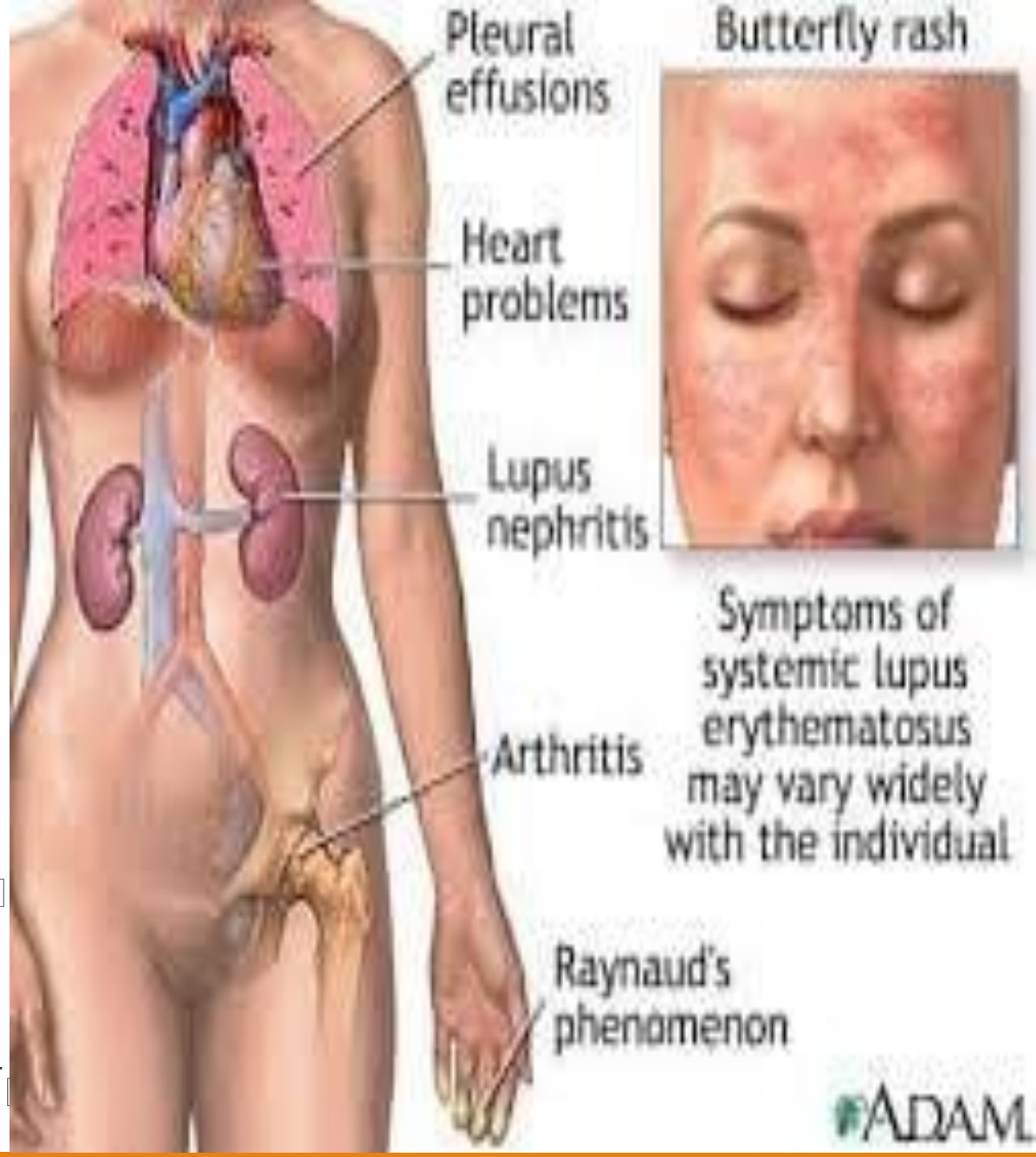
Spinal manifestations are uncommon and nonspecific, but a higher incidence of spinal findings is seen in those with deforming arthropathy. Up to 10% may have atlantoaxial subluxation/dislocation.

Osteonecrosis

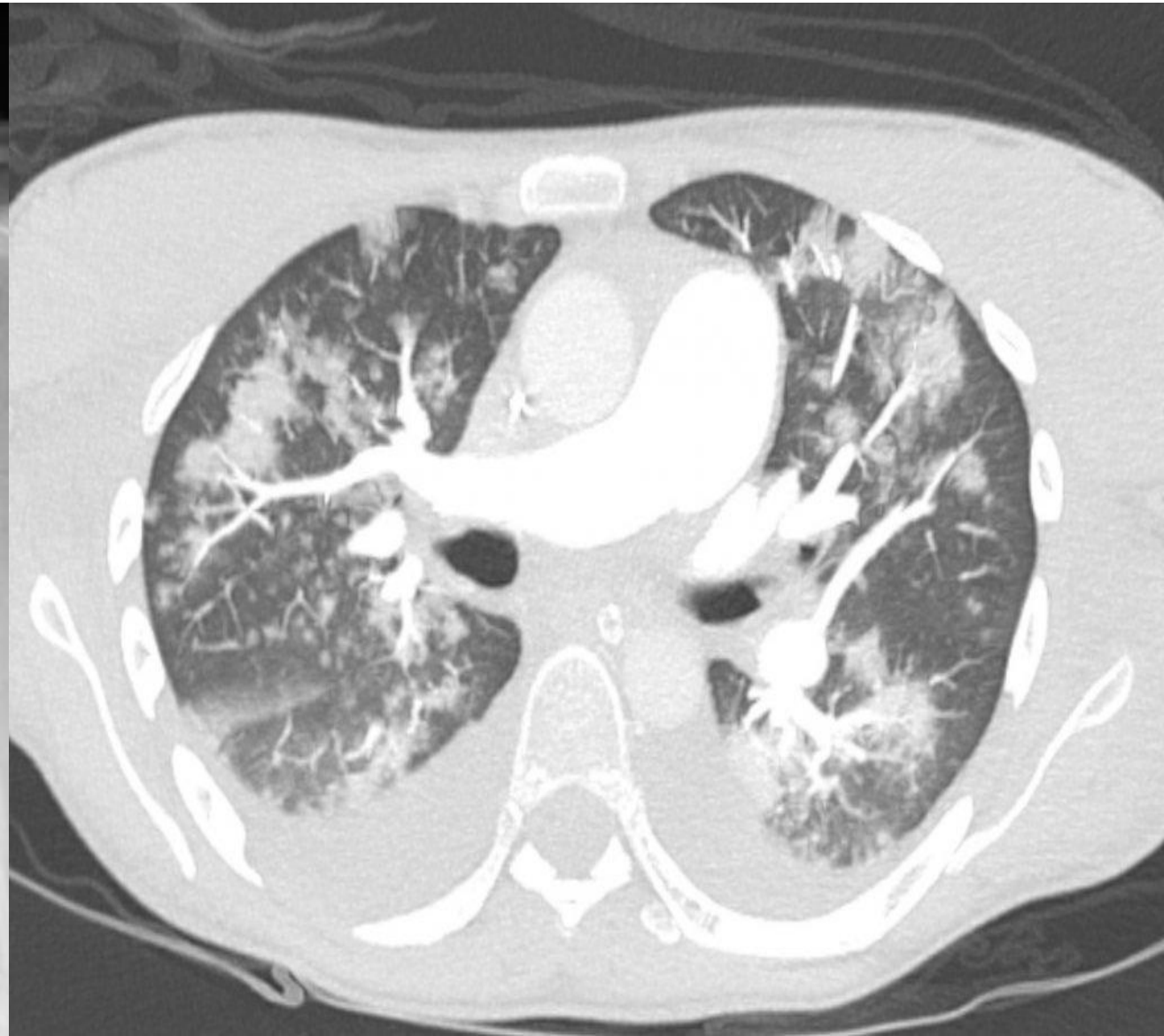
The most common location of osteonecrosis is the femoral head, but nearly any site may be affected. This is more commonly seen in younger patients and those with Raynaud phenomenon and other signs of vasculitis. This may also be seen as a complication of steroid therapy.

Calcifications

Linear or nodular calcification in the subcutaneous and deep soft tissues may be seen, especially around the small joint of extremities. Associations with diuretic therapy and vitamin D supplementation has been documented.


Pleural effusions
Heart problems
Lupus nephritis
Arthritis
Raynaud's phenomenon
Butterfly rash
Symptoms of systemic lupus erythematosus may vary widely with the individual
A.D.A.M.

Lungs: More than 50% of people with lupus have some sort of lung disease. Inflammation of the lining of the lung (pleurisy) is the most common problem. This can lead to chest pain and shortness of breath and can be confused with blood clots in the lung or lung infection (pneumonia). Collections of water in the space between the lung and the chest wall occur as well (called pleural effusions). Pneumonia can occur in lupus patients who are taking immunosuppressive medications.



osteonecrosis of hips

soft tissue calcification

Radiological aspects in Rheumatological disorders:

Rheumatoid arthritis affects the small joints like those in the hand and foot , can involve the large joints like the knee and hip . Xrays may show soft tissue swelling , small joint erosions , loss of joint space ,osteopenia .

Ankylosing spondylitis mostly affects the spine . There is loss of normal movement in spine as the disease progresses. Xrays of spine may show calcification in ligaments around the vertebrae but disc space is preserved. Fusion of the posterior elements in spine may occur.

Psoariatic arthritis is a skin disorder that also affects the joints like those in the hand and foot . Xrays may show erosive bone lesions and soft tissue swelling. Gouty arthritis occurs when serum uric acid levels are high and calcific trophi get deposited in the small joints of hand and foot. Xray of hand and foot may show the calcified gouty trophy at small joints, bony erosions and soft tissue swelling.

Sacroiliitis is inflammation of sacroiliac joint located in the lower back region . Sacroiliitis can cause pain in lower back and can extend down one or both legs. Activities like prolonged standing or climbing steps can worsen the pain.. Xrays would show sclerotic inflammatory changes at sacroiliac joints.

Systemic lupus erythematosis (SLE) is a chronic systemic disease which can affect the joints . Patients can have sun sensitivity rashes, hair loss , swelling or tenderness of the small joints of the hands, feet,knees, and wrists, ulcers in mouth , fluid collection in chest and cardiac regions . Hand xrays may show soft tissue swelling of the involved joints, periarticular osteoporosis, and normal joint spaces.

Scleroderma, also known as systemic sclerosis , is a multi-system autoimmune connective tissue disorder. Xray of Hands may show joint space narrowing , erosions, periarticular osteoporosis , soft tissue calcification.

Juvenile rheumatoid arthritis, is the most common chronic arthritic disease of childhood . Joint pains may involve large and small joints of more than 6 weeks duration. X-ray of hand may show soft tissue swelling, osteopenia, loss of joint space, erosions and joint subluxation. Cervical spine xrays may show subluxation and erosions at 1st and 2nd cervical vertebrae, fusion of the posterior elements of cervical vertebrae.

Osteoarthritis is degenerative disorder of joints . Sometimes in long standing cases of inflammatory joint disorders like Rheumatoid arthritis may progress and cause degenerative changes at joints . Xrays may show osteophyte formation, joint space narrowing, subchondral sclerosis and cysts.


Thank you!