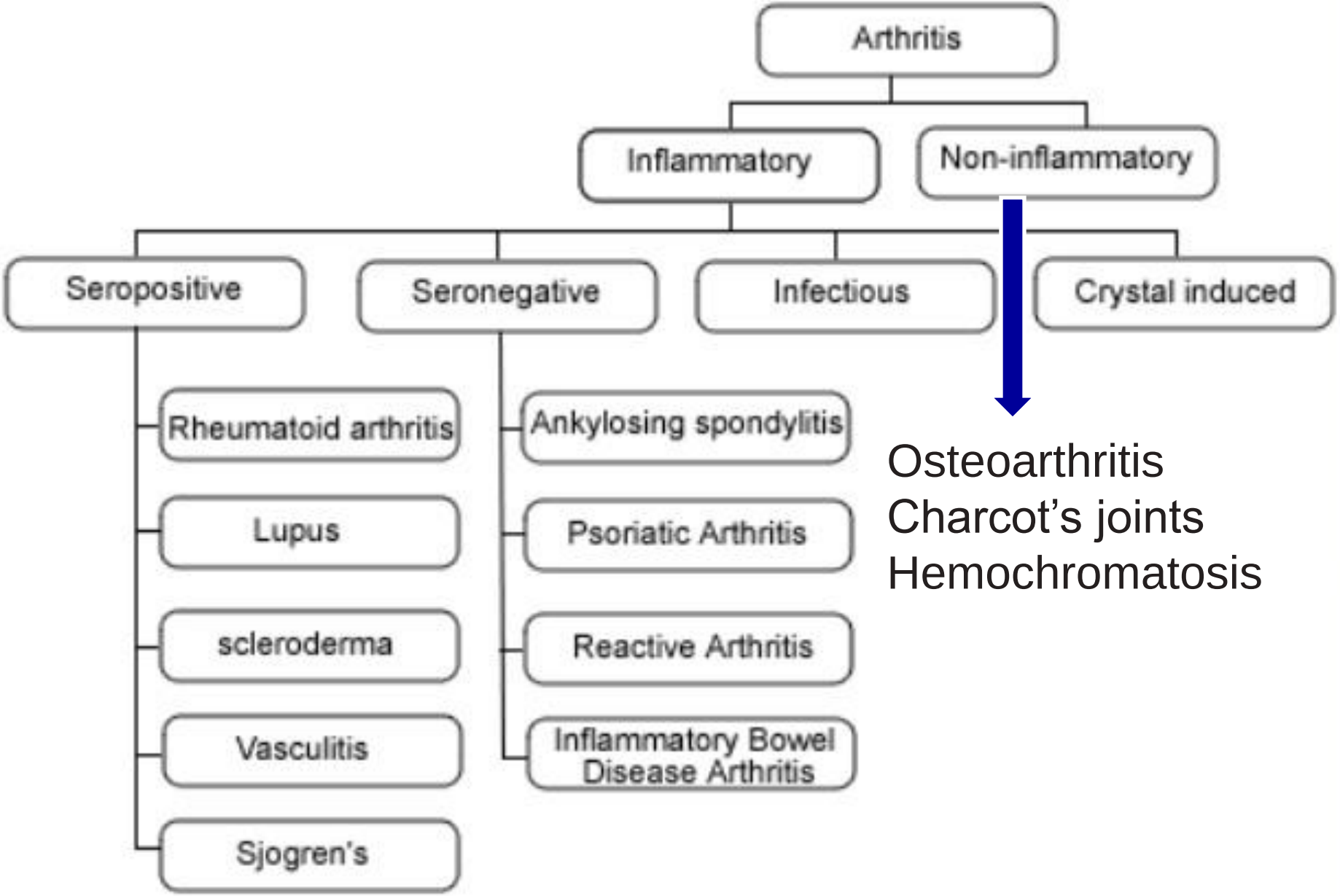

بسم الله الرحمن الرحيم

Evaluation of arthritis

Disorder that affects joints. Symptoms generally include joint pain and stiffness. redness, warmth, swelling, and decreased range of motion of the affected joints

Acute
Chronic
Inflammatory
Non inflammatory

Classification of Arthritis



Osteoarthritis
Charcot's joints
Hemochromatosis

Classification…

Autoimmune:	Rheumatic, Rheumatoid, Ankylosing spondylitis, Reiter syndrome etc.
Degenerative:	Osteroarthritis
Crystal Deposition:	Gout – Monosodium urate
	CPPD - Pseudo Gout
Infective –	Septic, TB, Lyme etc. rare.

Arthritis Clinical Classification:

Monoarthritis:	Local, asymmetric, secondary.	**Acute:** Bacterial, Trauma, Crystal, Reactive
		Chronic : Tuberculosis, Lyme, Fungal, Trauma, Tumors.
Polyarthritis:	Chronic, symmetric, systemic.	
	Autoimmune, degenerative, Crystal.	
	Rarely infective.	

History

- Age
- Occupation, and social, drug, travel
- Sexual history
- Pain and joint stiffness
- Diurnal variation
- Aggravating and relieving factors
- Trauma, joint locking
- Systemic symptoms (fevers, sweats, rigors, and weight loss)
- Ocular, oral, respiratory, gastrointestinal, or skin symptoms

EXAMINATION

- Pain, erythema, swelling, heat, and loss of function
- joint instability, limited movement, and deformity
- ocular signs, skin rashes, ulcers, and nodules

Blood

- CBC- ESR –CRP –ANA – RF –Anti ccp
- ACE –ANCA- PT –PTT – Plt –ASOT –TFT -LFT
- Viral screening (IgG and IgM antibodies)- HLA ……

Urine

Diagnosis	Cells	Microorganisms	Appearance	Imaging Modality	Comments
Bacterial arthritis	Neutrophils, 10,000-100,000	Gram stain usually positive	Turbid/pus	Aspiration to dryness; may need ultrasound	Systemic symptoms, Gram stain, blood and synovial fluid culture
Gonococcal arthritis	Neutrophils, 10,000-100,000	Gram stain usually positive	Turbid/pus	Aspiration to dryness; may need ultrasound	Systemic symptoms, Gram stain, blood and synovial fluid culture
Crystal arthritis	Neutrophils, 10,000-100,000	—	Turbid/pus	XR, CPPD	Presence of appropriate crystals Acute serum urate unreliable
Tuberculous arthritis	Mononuclear 5000-50,000	Acid-fast stain often negative	Turbid/pus		At-risk population; Ziehl-Neelsen stain biopsy may be necessary
Inflammatory monoarthropathies	Neutrophils 5000-50,000	—	Slightly turbid	Ultrasound/MRI for early synovitis and erosions	Serum autoantibodies such as RF, ACPA, ANA
Osteoarthritis	Mononuclear 0-2000	—	Clear	XR changes	Usually non-inflammatory CPPD may be present
Internal derangement	Red blood cells	—	Clear/turbid	MRI	Arthroscopy may be necessary
Trauma	Red blood cells	—	Clear/turbid	XR	Tc bone scan may aid diagnosis if radiograph normal
Ischemic necrosis		—		MRI in early disease	XR abnormal only in advanced cases
Uncommon Causes					
Sarcoidosis	Mononuclear, 5000-20,000	—		CXR	
PVNS	Red blood cells	—	Turbid	Ultrasound and MRI	Synovial biopsy essential
Charcot's	Mononuclear, 0-2000	—		XR	CPPD may be present
Lyme disease	Neutrophils, 0-5000	—	Clear/turbid		SF eosinophilia may be found Serology for *Borrelia*
Amyloid	Mononuclear 2000-10,000	—	Turbid		Synovial biopsy for Congo red stain

Imaging Studies

- Radiography :
  - Soft tissue swelling, calcium in periarticular tissues,
  - Fractures, local bone disease, and loose bodies, destructive changes

- Computed tomography (CT)
  - CT scanning better identifies fractures, bone diseases, and intra-abdominal and chest pathology

- Musculoskeletal ultrasound

- MRI
  - Although it is the best technique for soft tissue Imaging Internal ligament damage and tendon enthesitis and AVN

TABLE 76-2 DIFFERENTIATING FEATURES OF COMMON ARTHRITIDES

DISEASE	DEMOGRAPHICS	JOINTS INVOLVED	SPECIAL FEATURES	LABORATORY FINDINGS
Gout	Men, postmenopausal women	Monoarticular or oligoarticular	Podagra, rapid onset of attack, polyarticular gout, tophi	SF: Crystals, high WBC count, >80% PMNs
Septic arthritis	Any age	Usually large joints	Fever, chills	SF: High WBC count, >90% PMNs, culture
Osteoarthritis	Increases with age	Weight-bearing, hands		Noninflammatory SF
Rheumatoid arthritis	Any age, predominantly women ages 20-50 yr	Symmetrical, small joints disease	Rheumatoid nodules, extra-articular	SF: High WBC count, >70% PMNs
Reactive arthritis (Reiter's syndrome)	Young males	Oligoarticular, asymmetrical	Urethritis, conjunctivitis, skin and mucous membranes	SF: Moderate WBC count, >50% PMNs
Spondyloarthropathy	Young to middle-aged men	Axial skeleton, pelvis (sacroiliac joints)	Uveitis, aortic insufficiency, enthesopathy	
Systemic lupus erythematosus	Women in childbearing years	Hands, knees	Nonerosive joint disease, autoantibodies, mostly mononuclear; multiorgan disease	SF: Low to moderate WBC count, almost 100% have antinuclear antibodies

بیمار آقایی ۲۵ ساله با درد وتورم مچ پا همراه با گرمی و بدنبال ان هر دو زانو از چند روز قبل / زخم وضایعه پوستی ندارد /معاینه چشم نرمال .....

در ازمایشات مختصری ESRافزایش دارد
مایع مفصل: کشت منفی / WBC برابر ۷۰۰۰
سابقه عفونت ادراری را در چند هفته قبل میدهد

تشخیص: آرتریت راکتیو
درمان: ایندومتاسین

بیمار آقای ۷۵ ساله با درد وتورم مفاصل اندام فوقانی و تحتانی /ابتدا اولین MTPدرگیر اما طی چند ماه بقیه مفاصل درگیر شده است /در معاینه یکسری توده های ندولار و سفت در سطوح مفصلی و اطراف ان مشهود است(توفوس)

اسید اوریک : ۸

کراتینین : ۱/۵

Parameters	Value	Unit	Normal Value
WBC	**35.1***	x1000/mm3	(4.1-10.1)
RBC	**4.41**	milion/mm3	(4.2-5.8)
Hgb	**12.7**	g/dl	(12-16)
Hct	**39.3**	%	(36-51)
MCV	**89.1**	**fl**	(77-94)
MCH	**28.8**	pg	(26-33)
MCHC	**32.3**	g/dl	(31-37)
RDW-CV	**13.2**	**fl**	(11-16)
RDW-SD	**44.6**	**%**	(39-46)
PLT	**139**	x1000/mm3	(150-400)
PDW	**12.1**	**fl**	(7.1-20)
MPV	**9.7**	**fl**	(9.1-13)
P-LCR	**23.5**	%	(13-43)

Technician :

Ward superint :

بیمار خانمی ۶۷ ساله با درد و تورم زانوی راست از چند روز قبل مراجعه در معاینه مفصل گرم ومتورم است/ یک ماه قبل هم چنین حمله ای داشته است

کشت مایع مفصل منفی

WBCبالای ۱۰۰۰۰

علیرغم دریافت انتی بیوتیک از یک هفته قبل علایم بیمار کاهش نیافته

بیمار آقایی ۴۵ ساله راننده تاکسی بادرد وتورم زانوی چپ از یک هفته قبل / تب ندارد /مفصل مختصری گرم است. بیمار در بخش عفونی بستری و تحت درمان با آنتی بیوتیک وسیع الطیف قرار گرفته اما بهبودی ندارد /درمعاینه کریپتاسیون دارد

کشت منفی / WBC<5000

ESR/ CRP نرمال

بیمار خانمی ۳۷ ساله بادرد مچ و بی حسی انگشتان اول تا سوم دست راست به پزشک متخصص ارتوپدی مراجعه

با توجه به NCV اندام فوقانی و گزارش تنگی کانال کارپ تحت عمل جراحی قرار گرفت . یک ماه بعد با علائم مشابه در دست چپ تحت عمل قرار میگیرد یک هفته بعد با همین علائم در مچ پا ها مراجعه میکند و نظر پزشک همچنان عمل جراحی است لذا با توجه به عدم بضاعت مالی به متخصص داخلی مراجعه میکند

معاینه : درد و تورم مفاصل مشهود است

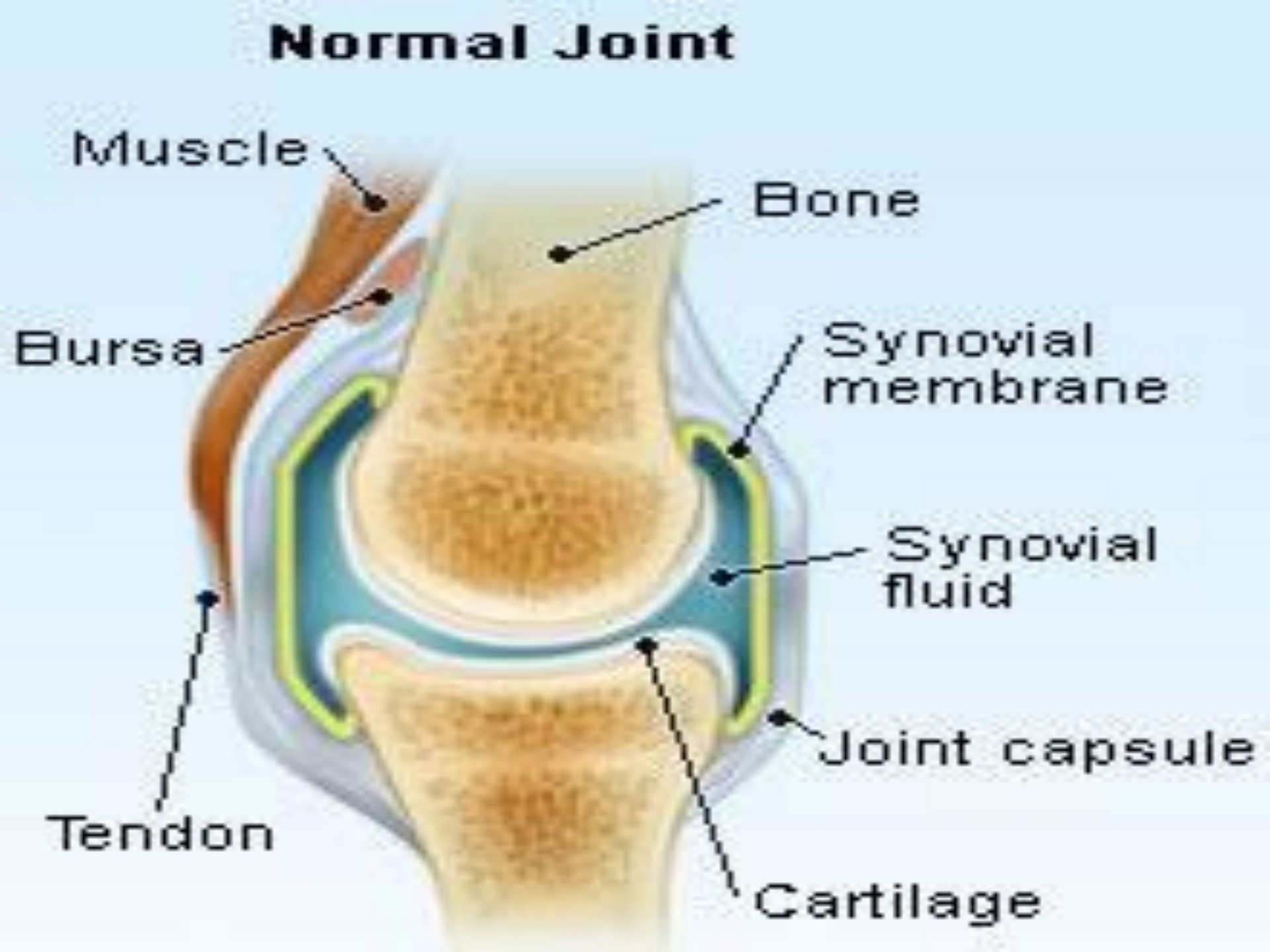
ازمایشات : افزایش ESR – CRP – RF

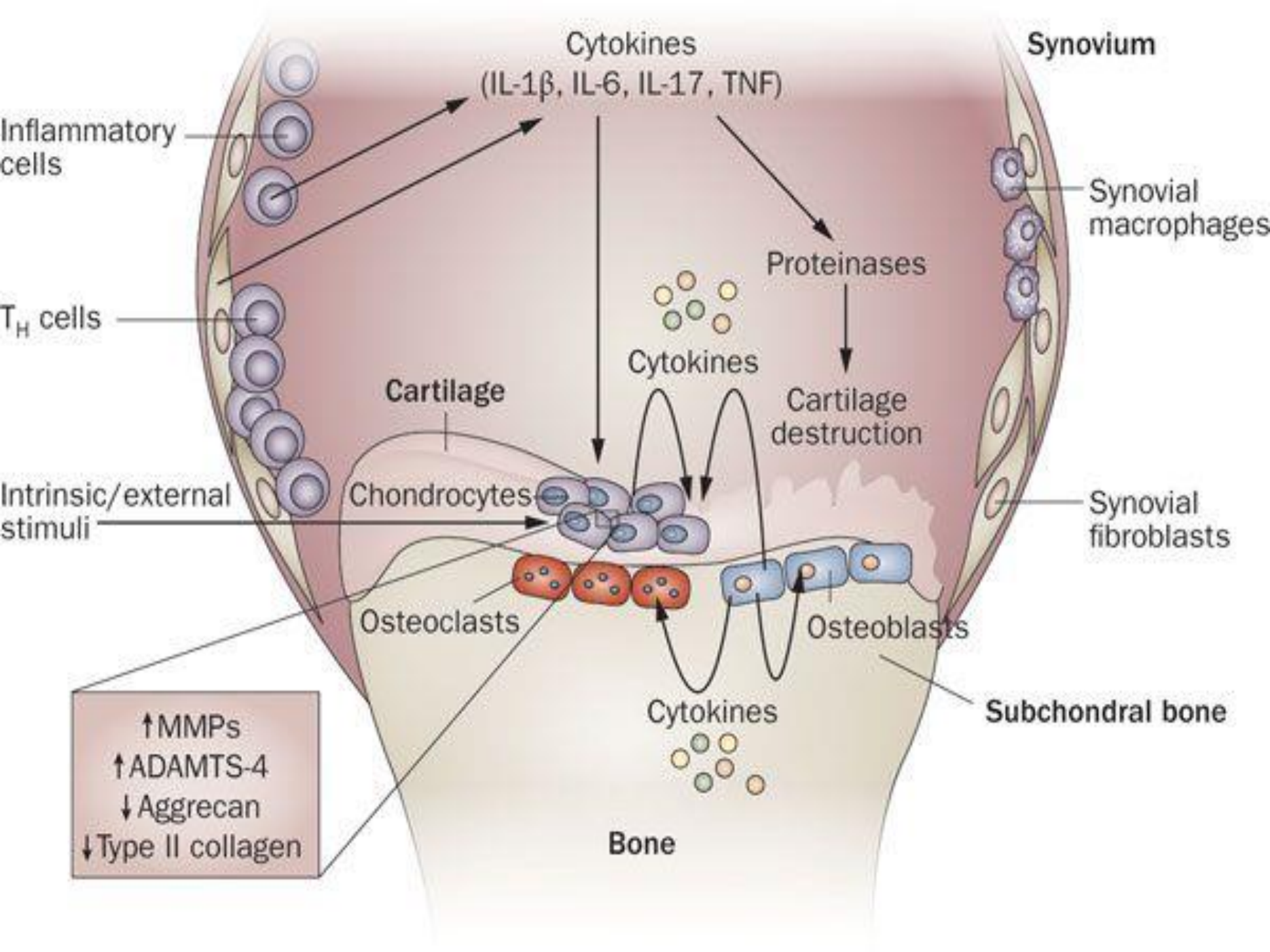
Rheumatoid Arthritis

Dr. P-soufivand

Definition

- Rheumatoid arthritis (RA) is a chronic inflammatory disease
- Unknown etiology
- Marked by a symmetric, peripheral polyarthritis.
- It is the most common form of chronic inflammatory arthritis and often results in joint damage and physical disability


Normal Joint
Muscle
Bone
Bursa
Synovial membrane
Synovial fluid
Joint capsule
Tendon
Cartilage


Cytokines
(IL-1β, IL-6, IL-17, TNF)
Synovium
Inflammatory cells
Synovial macrophages
Proteinases
T_H cells
Cytokines
Cartilage
Cartilage destruction
Intrinsic/external stimuli
Chondrocytes
Synovial fibroblasts
Osteoclasts
Osteoblasts
Cytokines
Subchondral bone
↑MMPs
↑ADAMTS-4
↓Aggrecan
↓Type II collagen
Bone

THE HALLMARK OF OA CARTILAGE DEGENERATION IS A LOSS OF CARTILAGE MATRIX HOMEOSTASIS

Osteoarthritis:
Imbalance of cartilage matrix turnover

Anabolism

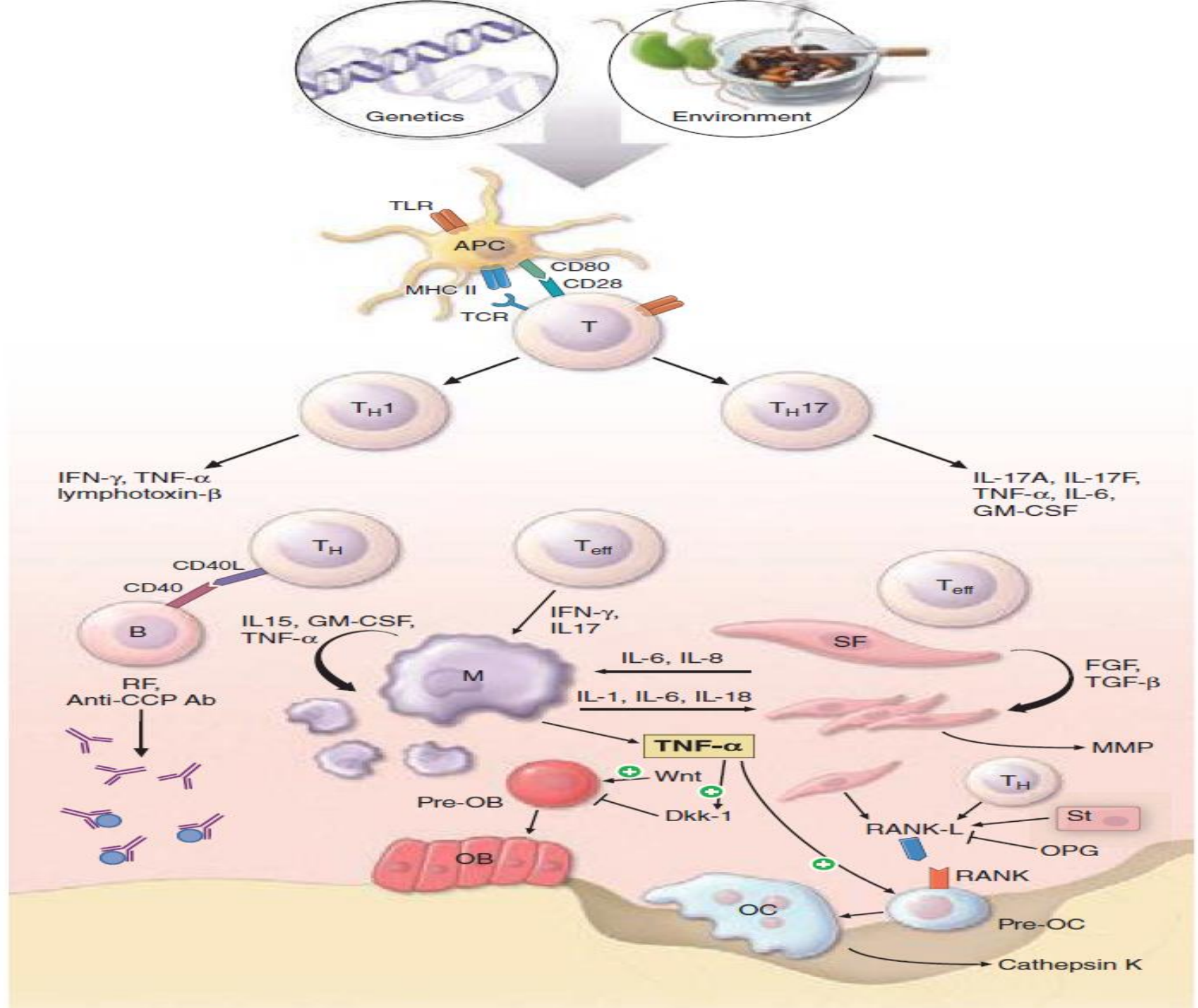
Aggrecan
(collagen type II)
Collagen type VI
Collagen type IX
Link protein
...

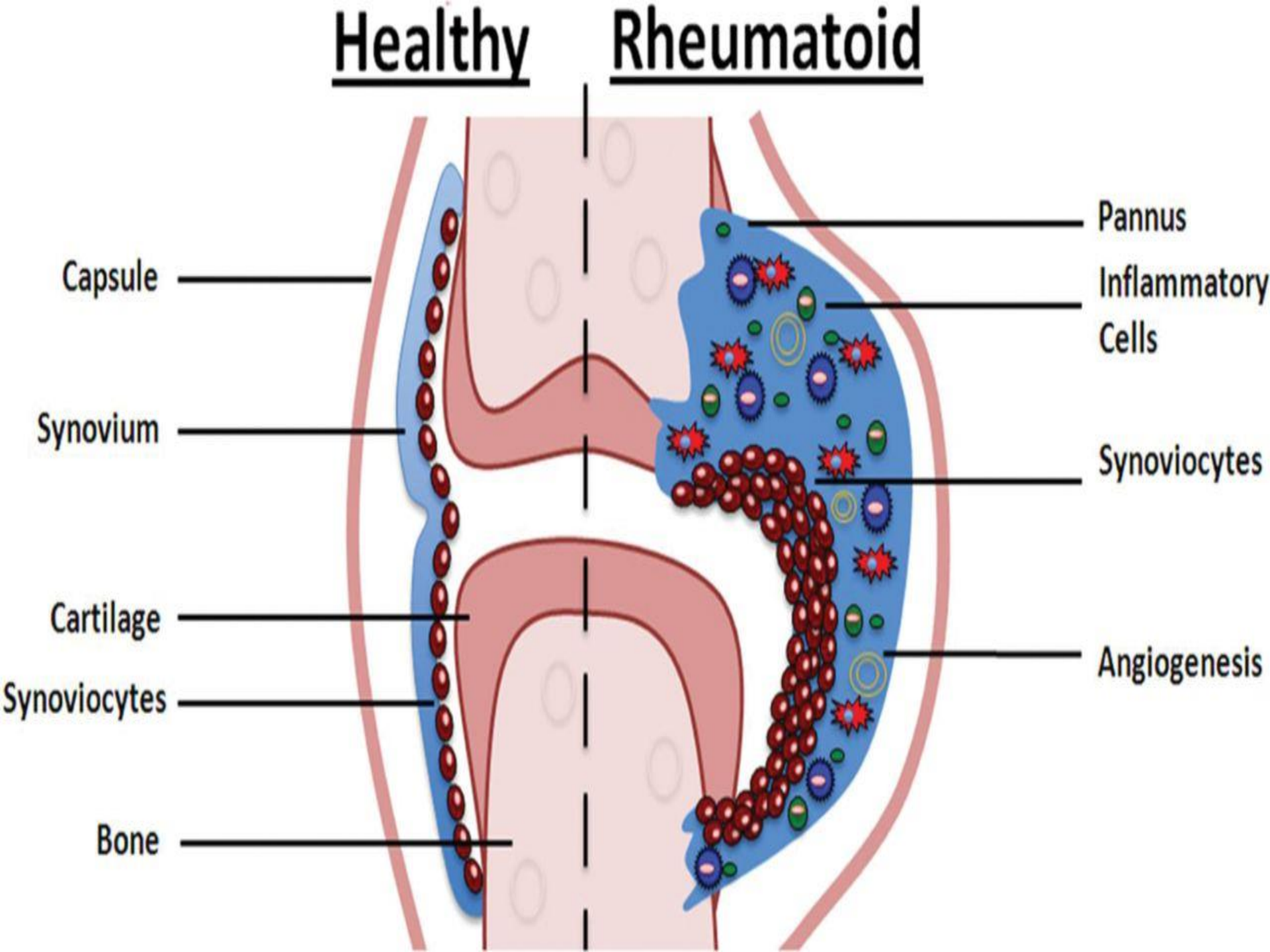
Catabolism

Collagenases
MMP-1
(MMP-8)
MMP-13

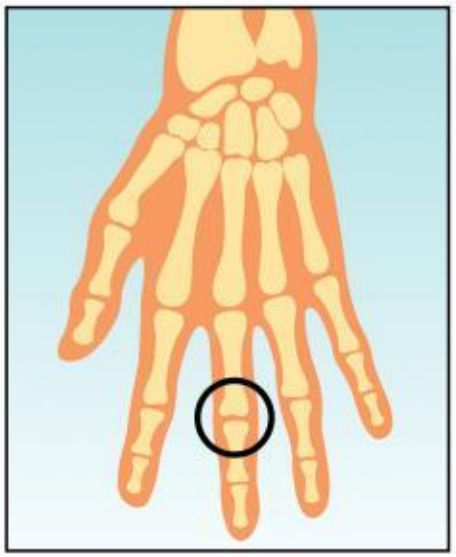
Gelatinase
MMP-2
MMP-9

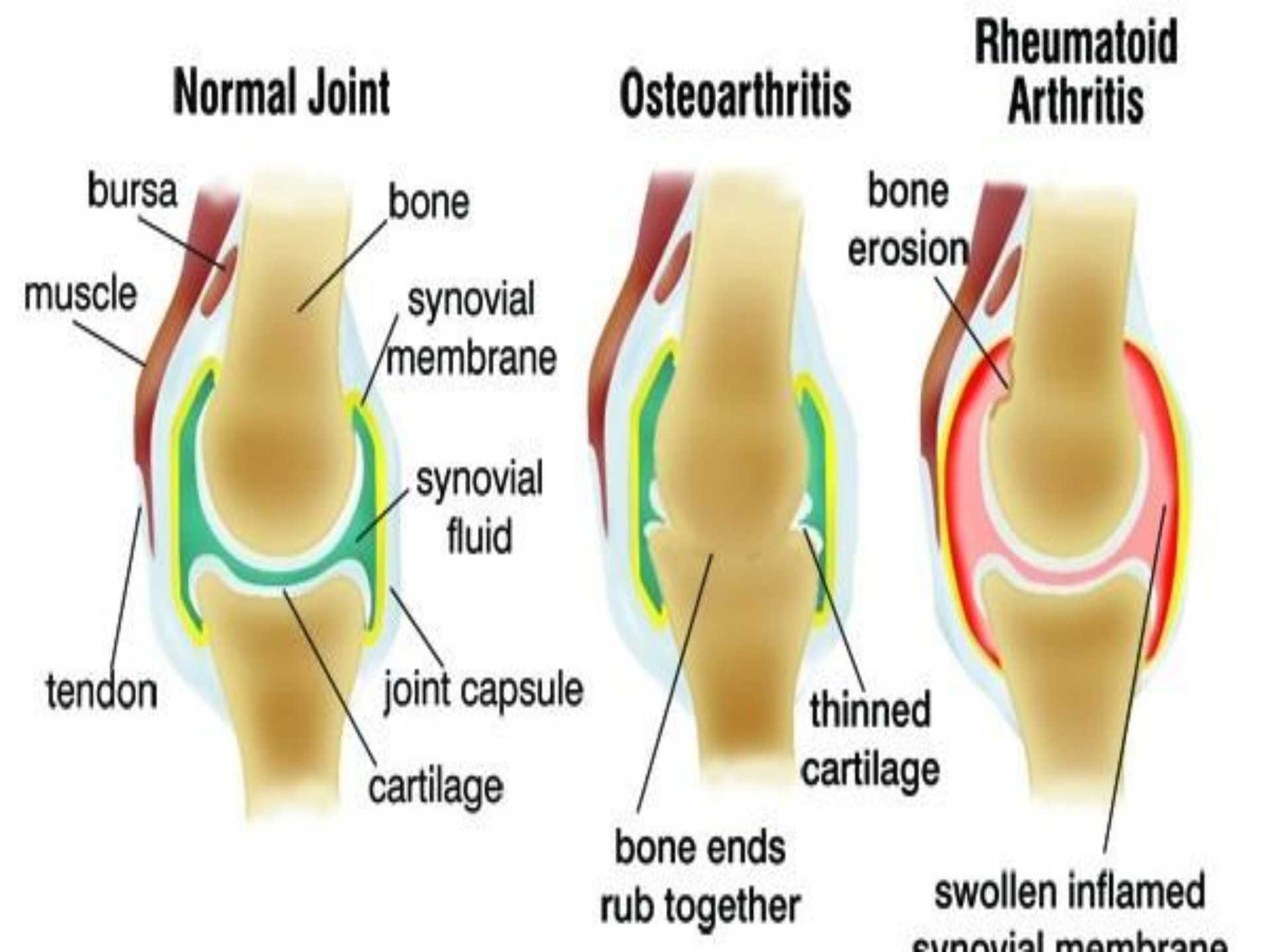
Aggrecanases
MMP-3
MMP-14
ADAMTS-1
ADAMTS-4
ADAMTS-5

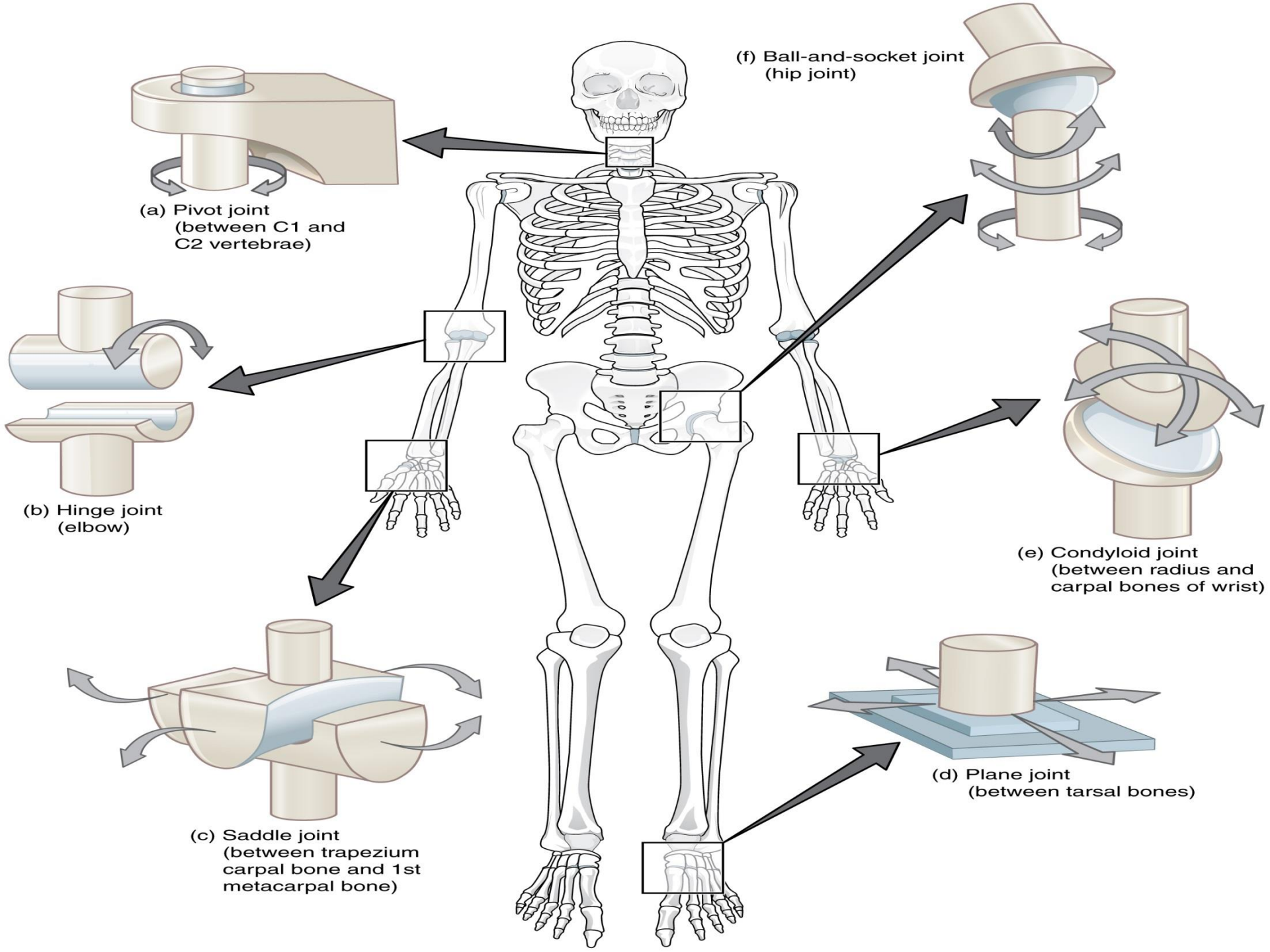

Genetics
Environment
TLR
APC
CD80
CD28
MHC II
TCR
T
T_H1
T_H17
IFN-γ, TNF-α
lymphotoxin-β
IL-17A, IL-17F,
TNF-α, IL-6,
GM-CSF
T_H
CD40L
CD40
B
RF,
Anti-CCP Ab
T_{eff}
IL15, GM-CSF,
TNF-α
IFN-γ,
IL17
M
IL-6, IL-8
IL-1, IL-6, IL-18
SF
T_{eff}
FGF,
TGF-β
MMP
TNF-α
Wnt
Dkk-1
Pre-OB
OB
T_H
RANK-L
St
OPG
RANK
OC
Pre-OC
Cathepsin K


Healthy
Rheumatoid
Capsule
Synovium
Cartilage
Synoviocytes
Bone
Pannus
Inflammatory Cells
Synoviocytes
Angiogenesis

Rheumatoid arthritis



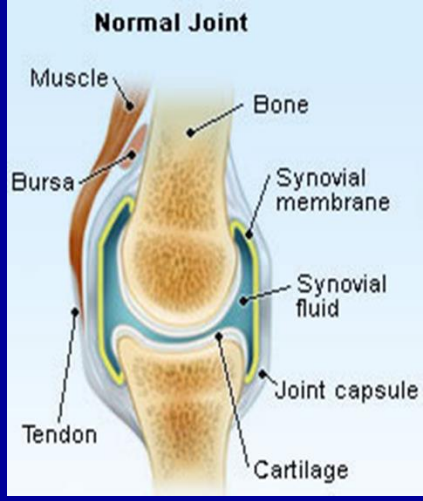

Normal Joint
Osteoarthritis
Rheumatoid Arthritis
bursa
bone
muscle
synovial membrane
synovial fluid
tendon
joint capsule
cartilage
bone erosion
thinned cartilage
bone ends rub together
swollen inflamed synovial membrane


(a) Pivot joint
(between C1 and
C2 vertebrae)
(b) Hinge joint
(elbow)
(c) Saddle joint
(between trapezium
carpal bone and 1st
metacarpal bone)
(f) Ball-and-socket joint
(hip joint)
(e) Condyloid joint
(between radius and
carpal bones of wrist)
(d) Plane joint
(between tarsal bones)

EPIDEMIOLOGY

- 0.5–1% of the adult population worldwide
- Females / males(2–3:1)
- The incidence of RA increases between 40 and 50 years of age
- After which it plateaus until the age of 75 and then decreases

CLINICAL FEATURES



- Inflammation of the joints, tendons, and bursae.
- Early morning joint stiffness (more than 1 h)
- The earliest involved joints are typically the small joints of the hands and feet.
- Monoarticular, oligoarticular (≤4 joints), or polyarticular (>5 joints)
- The wrists, metacarpophalangeal (MCP), and proximal interphalangeal (PIP)
- Distal interphalangeal(DIP)

Patterns of Onset

PRE-CLINICAL RHEUMATOID ARTHRITIS

Insidious Onset

55% to 65% The small joints of the hands, wrists, and feet symmetric, and is accompanied by morning stiffness

Less commonly, monoarticular or oligoarticular (elbows, knees, or hips)

Acute or Intermediate Onset

8% to 15%

polyarticular arthritis that

Small and large joints

Atypical Onset

Bursitis or tendonitis

Carpal tunnel syndrome

Palindromic Rheumatism

Uncommon

a few hours to a few days.

often monoarticular

knees, fingers, or shoulders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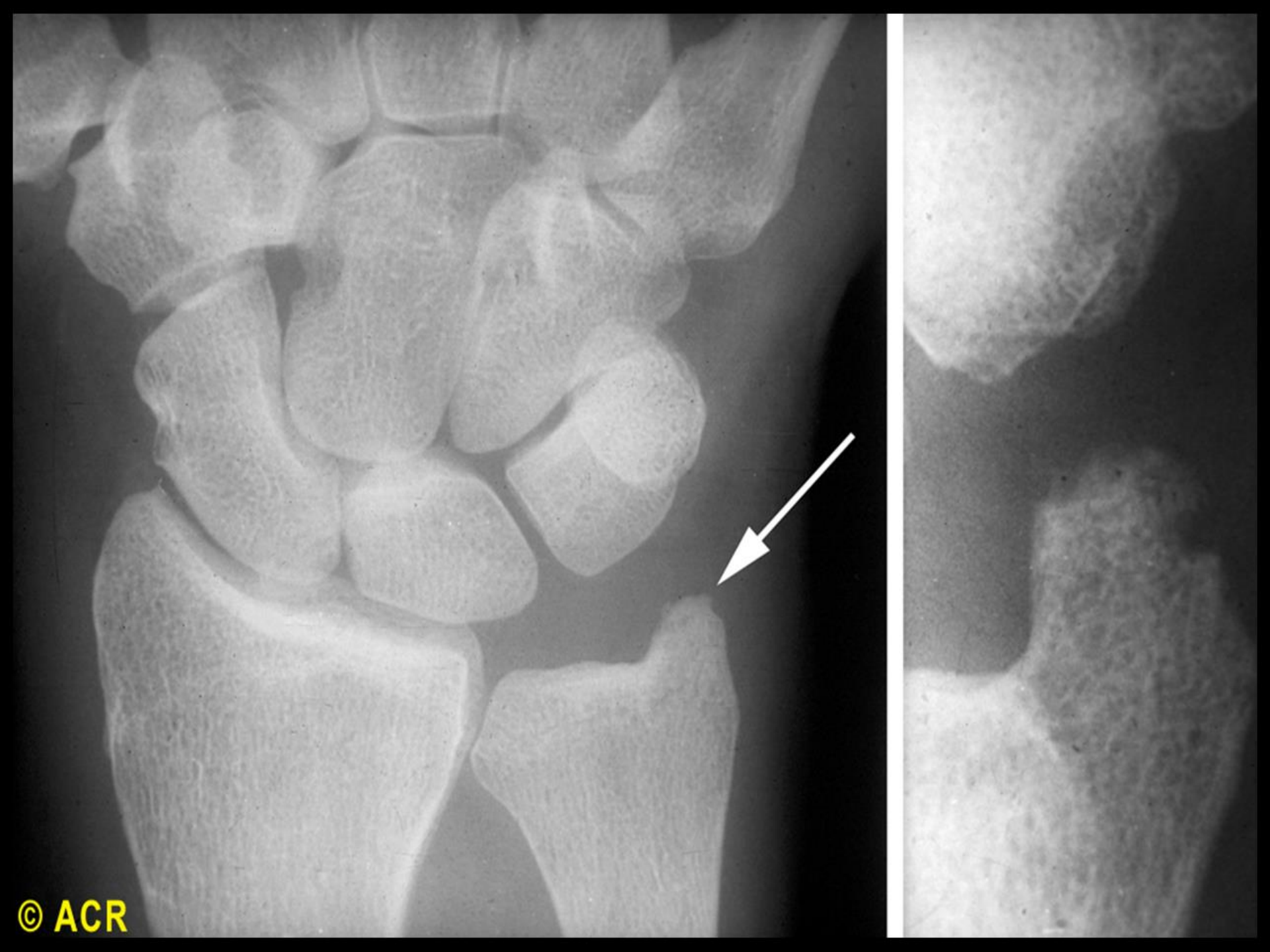

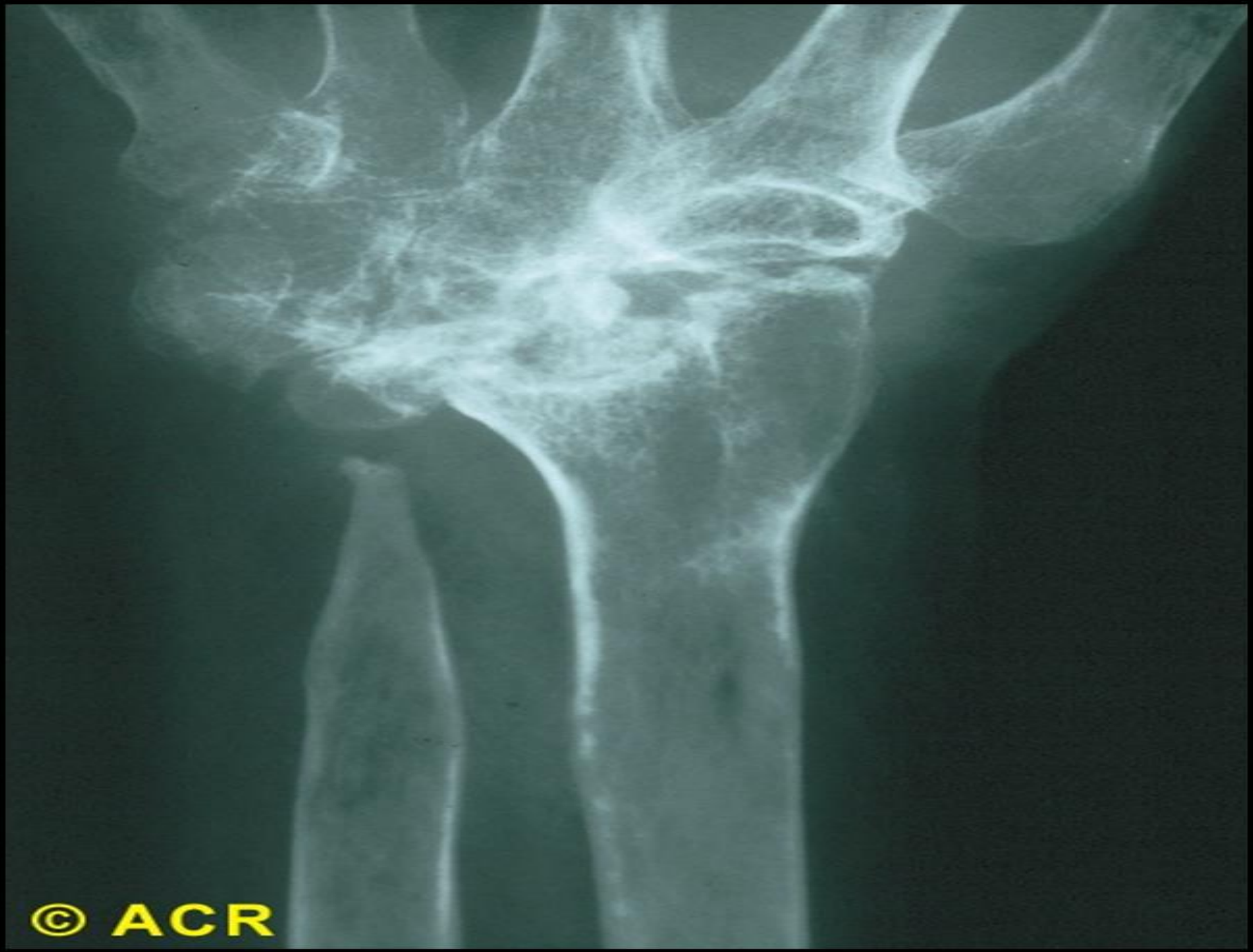
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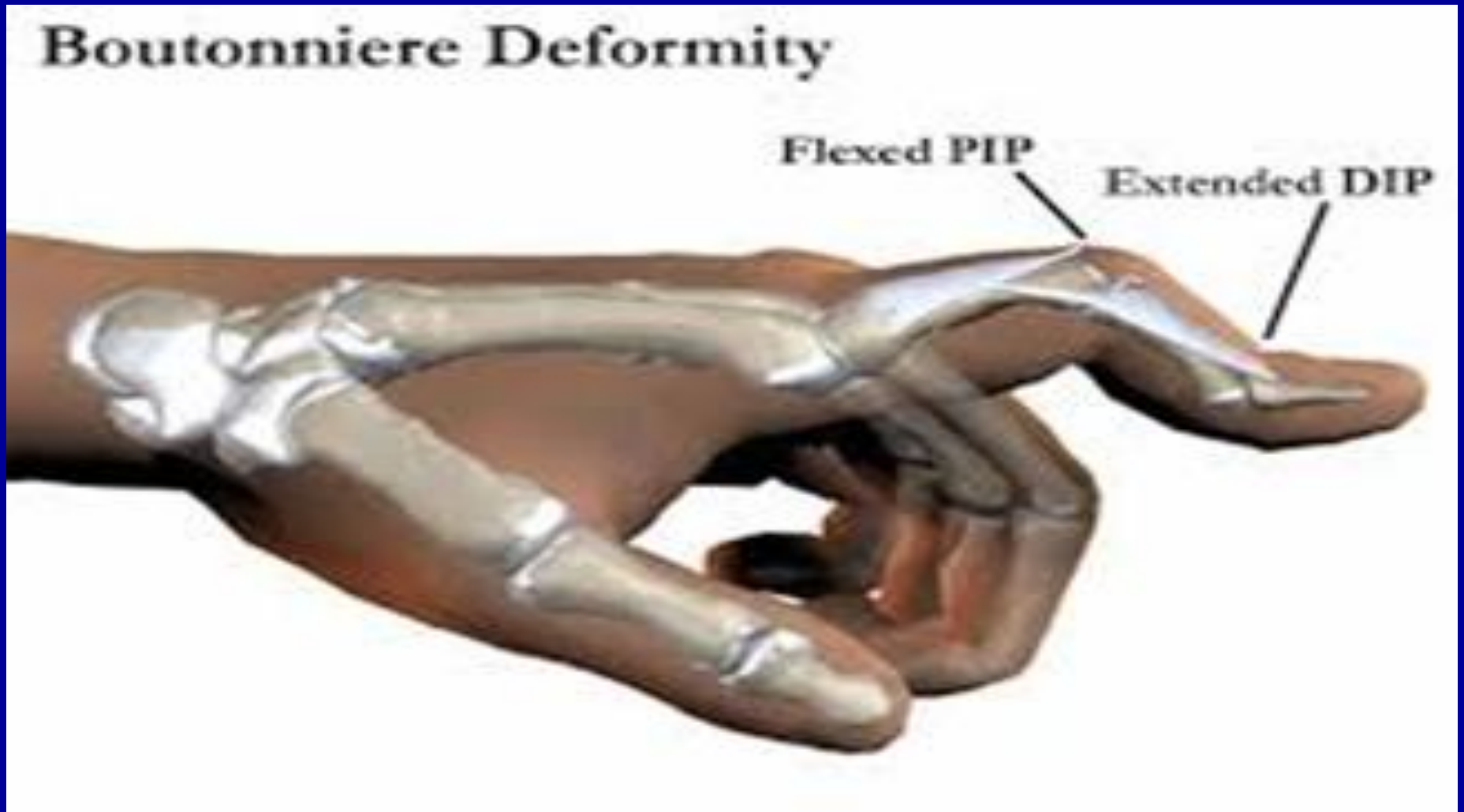
Ulnar deviation results from subluxation of the MCP joints, with subluxation of the proximal phalanx to the volar side of the hand. Hyperextension of the PIP joint with flexion of the DIP joint

("swanneck
deformity"), flexion of the PIP joint with hyperextension of the DIP joint

boutonnière deformity”), and subluxation of the first MCP joint with hyperextension of the first interphalangeal (IP) joint



Z deformity

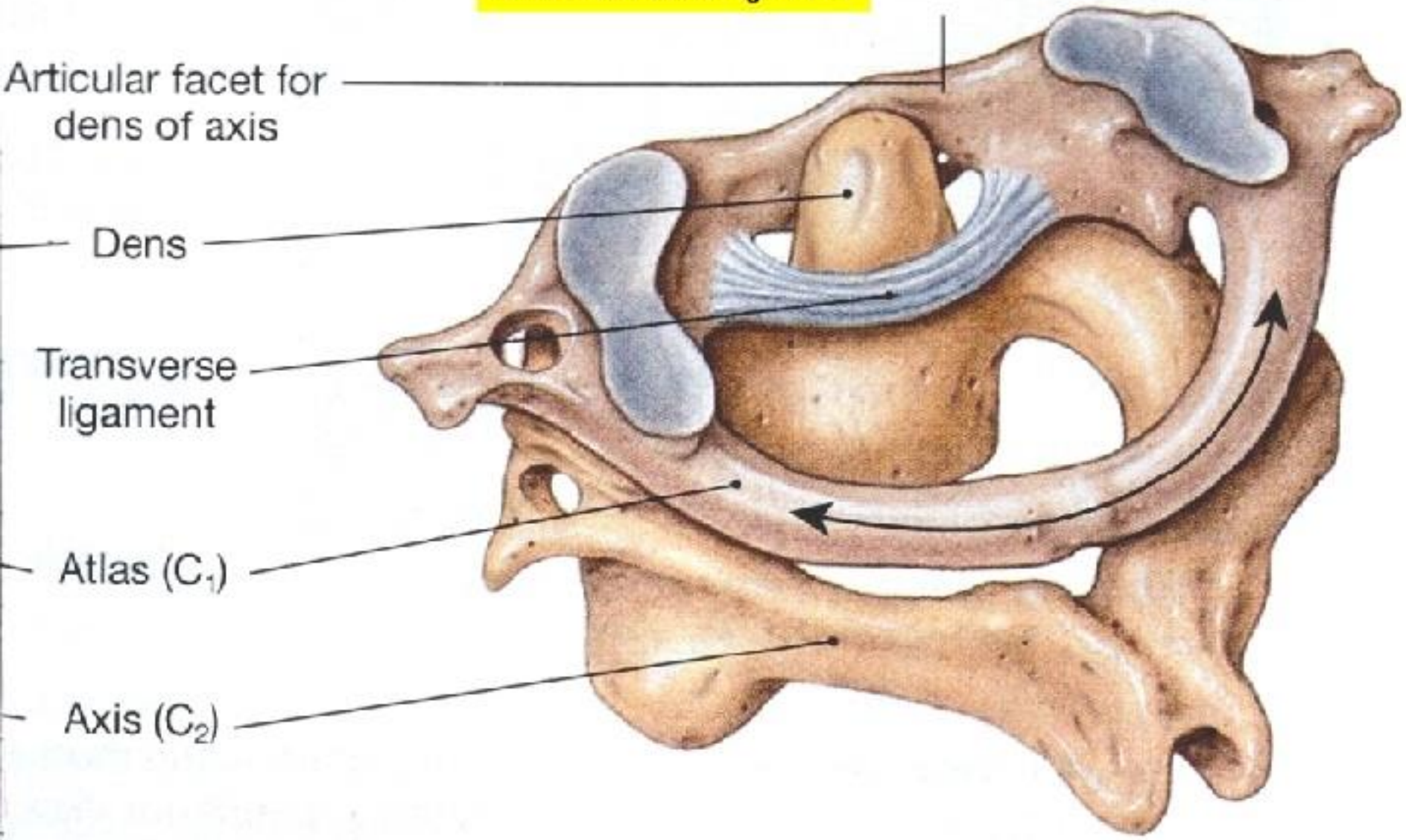

A
B

piano-key

Atlantoaxial involvement

- Neurologic manifestations
- Instability of C1 on C2
- Atlantoaxial subluxation has been declining in recent years
- Occurs now in less than 10% of patients

Atlantoaxial joint



(f) The articulated atlas and axis; note the location and orientation of the transverse ligament.


2
3
4
5
6
7
1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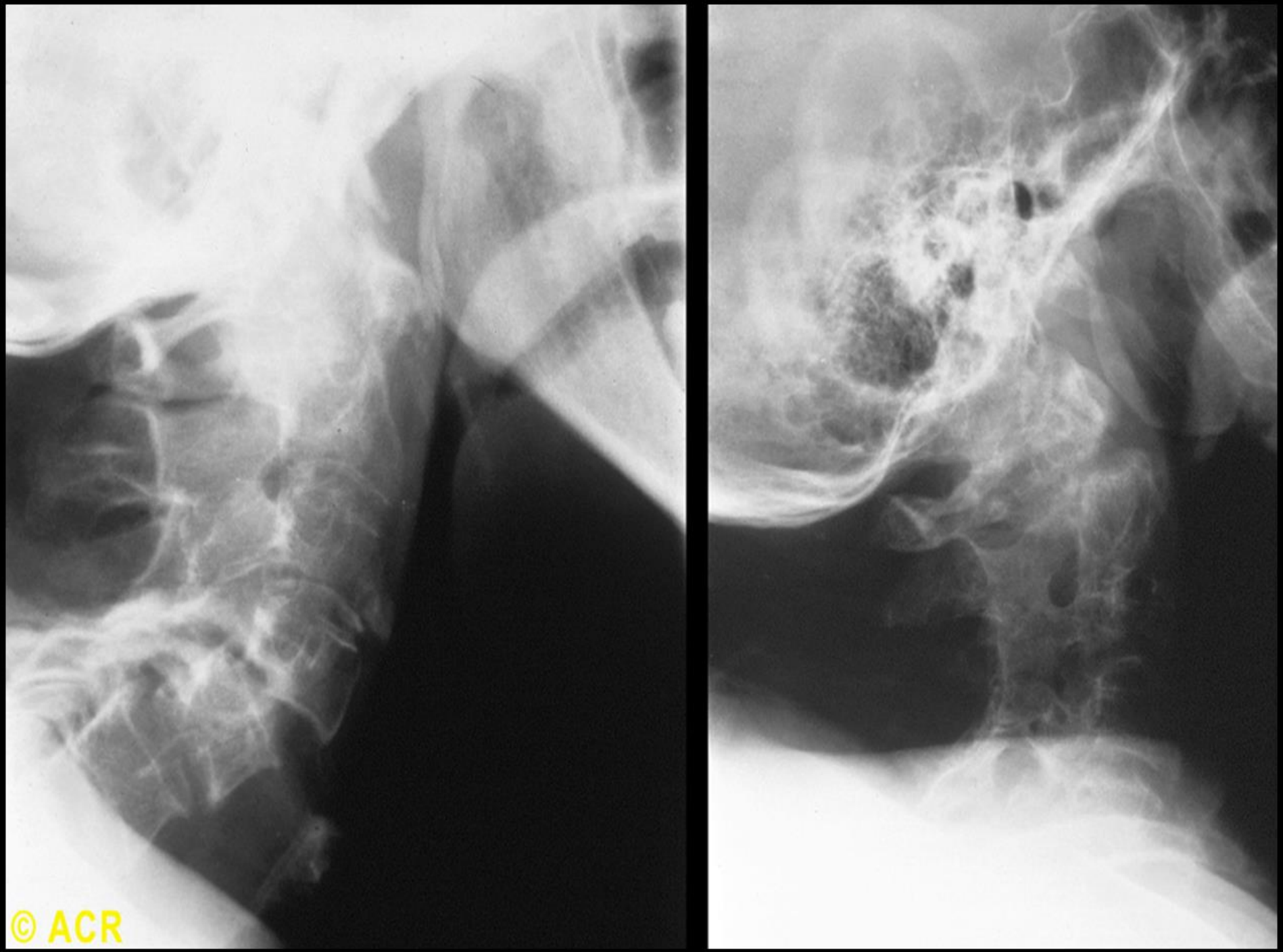


- CONSTITUTIONAL
- Weight loss, fever, fatigue, malaise,depression, and in the most severe cases

- they generally reflect a high degree of inflammation

- Fever of >38.3°C at any time during the clinical course(systemic vasculitis or infection)

- NODULES
- Subcutaneous nodules (30–40%)
- Highest levels of disease activity
- A positive test for serum RF
- Firm , nontender
- The tendons, or bursae , forearm, sacral prominences, and Achilles tendon.
- The lungs, pleura, pericardium, and peritoneum.
- Nodules are typically benign, although they can be associated with infection, ulceration, and gangrene

- PULMONARY
- Pleuritis , the most common pulmonary manifestation of RA,
  Chest pain , dyspnea, pleural friction rub and effusion.

- Pleural effusions (increased numbers of monocytes and neutrophils)

- Interstitial lung disease (ILD) (dry cough and progressive shortness of breath)

- ILD can be associated with cigarette smoking and is generally found in patients with higher disease activity

- CT scan

- CARDIAC
- Pericarditis

- Rheumatoid nodules , infiltrated with amyloid. Mitral regurgitation

- VASCULITIS
- Long-standing disease, a positive test for serum RF, and hypocomplementemia

- Less than 1% of patients

- Petechiae , purpura, digital infarcts, gangrene, livedo reticularis, and in severe cases large, painful lower extremity ulcerations.

- HEMATOLOGIC
- A normochromic, normocytic anemia
- The degree of anemia parallels the degree of inflammation
- C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR)
- Platelet counts
- *Felty's syndrome* : Neutropenia , splenomegaly, and nodular RA (1%)
- T cell large granular lymphocyte leukemia (T-LGL)

Cardiovascular Disease

- The most common cause of death

- The incidence of coronary artery disease and carotid atherosclerosis is higher in RA patients than in the general population

Osteoporosis

- Osteoporosis is more common in patients with RA than an age- and sex-matched population, with prevalence rates of 20–30%.
- The inflammatory milieu of the joint probably , Chronic use of glucocorticoids and disability-related immobility also contributes to osteoporosis

DIAGNOSIS

- Inflammatory arthritis, with laboratory and radiographic

- A score of 0–10, with a score of ≥ 6 fulfilling the requirements for definite RA.

SYNOVIAL FLUID ANALYSIS

- Inflammatory state.
- WBC counts (5000 and 50,000 WBC/μL)

Plain Radiography

- Soft tissue swelling
- Symmetric joint space loss, and subchondral erosions,
- Most frequently in the wrists and hands (MCPs and PIPs) and

the feet (MTPs).

TABLE 380-1 CLASSIFICATION CRITERIA FOR RHEUMATOID ARTHRITIS

		Score
Joint involvement	1 large joint (shoulder, elbow, hip, knee, ankle)	0
	2–10 large joints	1
	1–3 small joints (MCP, PIP, thumb IP, MTP, wrists)	2
	4–10 small joints	3
	>10 joints (at least 1 small joint)	5
Serology	Negative RF and negative ACPA	0
	Low-positive RF or low-positive anti-CCP antibodies (≤3 times ULN)	2
	High-positive RF or high-positive anti-CCP antibodies (>3 times ULN)	3
Acute-phase reactants	Normal CRP and normal ESR	0
	Abnormal CRP or abnormal ESR	1
Duration of symptoms	<6 weeks	0
	≥6 weeks	1

TREATMENT

- NSAIDs

- GLUCOCORTICOIDS

- DMARD(Disease modifying antirheumatic drug)

Their ability to slow or prevent structural progression of RA.

Hydroxychloroquine, sulfasalazine, methotrexate, and leflunomide; they exhibit a delayed onset of action of approximately 6–12 weeks.

- BIOLOGICALS

JUVENILE IDIOPATHIC ARTHRITIS

- JIA is the most common chronic rheumatologic disease of childhood
- with a prevalence of 1:1000 children
- 1 to 3 years and one at 8 to 12 years
- Girls are affected more commonly than boys

Table 89-1 Features of Juvenile Idiopathic Arthritis Subgroups

FEATURE	OLIGOARTICULAR	POLYARTICULAR	SYSTEMIC ONSET	SPONDYLOARTHROPATHIES
No. joints	<5	≥5	Varies, usually ≥5	Varies
Types of joints	Medium to large (also small in extended oligoarthritis)	Small to medium	Small to medium	Medium to large, including sacroiliac joints
Gender predominance	F > M (especially in younger children)	F > M	F = M	M > F
Systemic features	None	Some constitutional	Prominent	Some constitutional
Eye disease	+++ (uveitis)	++ (uveitis)	+ (uveitis)	++ (iritis)
Extra-articular manifestations	None	None	Systemic features	Enthesopathy, psoriasis, bowel disease
ANA positivity	++	+	—	—
RF positivity		+ (in older children with early-onset RA)		
Outcomes	Excellent, >90% complete remission	Good, >50% complete remission, some risk of disability	Variable, depends on extent of arthritis	Variable

ANA, Antinuclear antibody; *RA*, rheumatoid arthritis; *RF*, rheumatoid factor.

Table 89-2 Comparison of Juvenile Idiopathic Arthritis and Spondyloarthropathies

CLINICAL MANIFESTATIONS	JIA	JAS	PSA	IBD
Gender predominance	F	M	Equal	Equal
Peripheral arthritis	+++	+	++	+
Back symptoms	–	+++	+	++
Family history	–	++	++	+
ANA positivity	++	–	–	–
HLA-B27 positivity	–	++	–	
RF positivity	+ (in late-onset JIA)	–	–	–
Extra-articular manifestations	Systemic symptoms (systemic-onset JRA)	Enthesopathy	Psoriasis, nail changes	Bowel symptoms
Eye disease	Anterior uveitis iritis		Posterior uveitis	Anterior uveitis

ANA, Antinuclear antibody; *IBD*, inflammatory bowel disease; *JAS*, juvenile ankylosing spondylitis; *JIA*, juvenile idiopathic arthritis; *PSA*, poststreptococcal arthritis; *RF*, rheumatoid factor.

TREATMENT

- Nonsteroidal anti-inflammatory drugs (NSAIDs) are the first choice in the treatment of JIA.

- Systemic corticosteroid

- Second-line : hydroxychloroquine and sulfasalazine, **Methotrexate**

- **Etanercept, infliximab**, and **adalimumab,**

DD:

Juvenile idiopathic arthritis

Systemic lupus erythematosus

Juvenile dermatomyositis

Scleroderma with arthritis

Bacterial arthritis

Viral arthritis

Fungal arthritis

Poststreptococcal arthritis

Rheumatic fever

Henoch-Schönlein purpura

Reiter syndrome

Traumatic arthritis

Legg-Calve-Perthes disease

Growing pains

DD :

Leukemia

Lymphoma

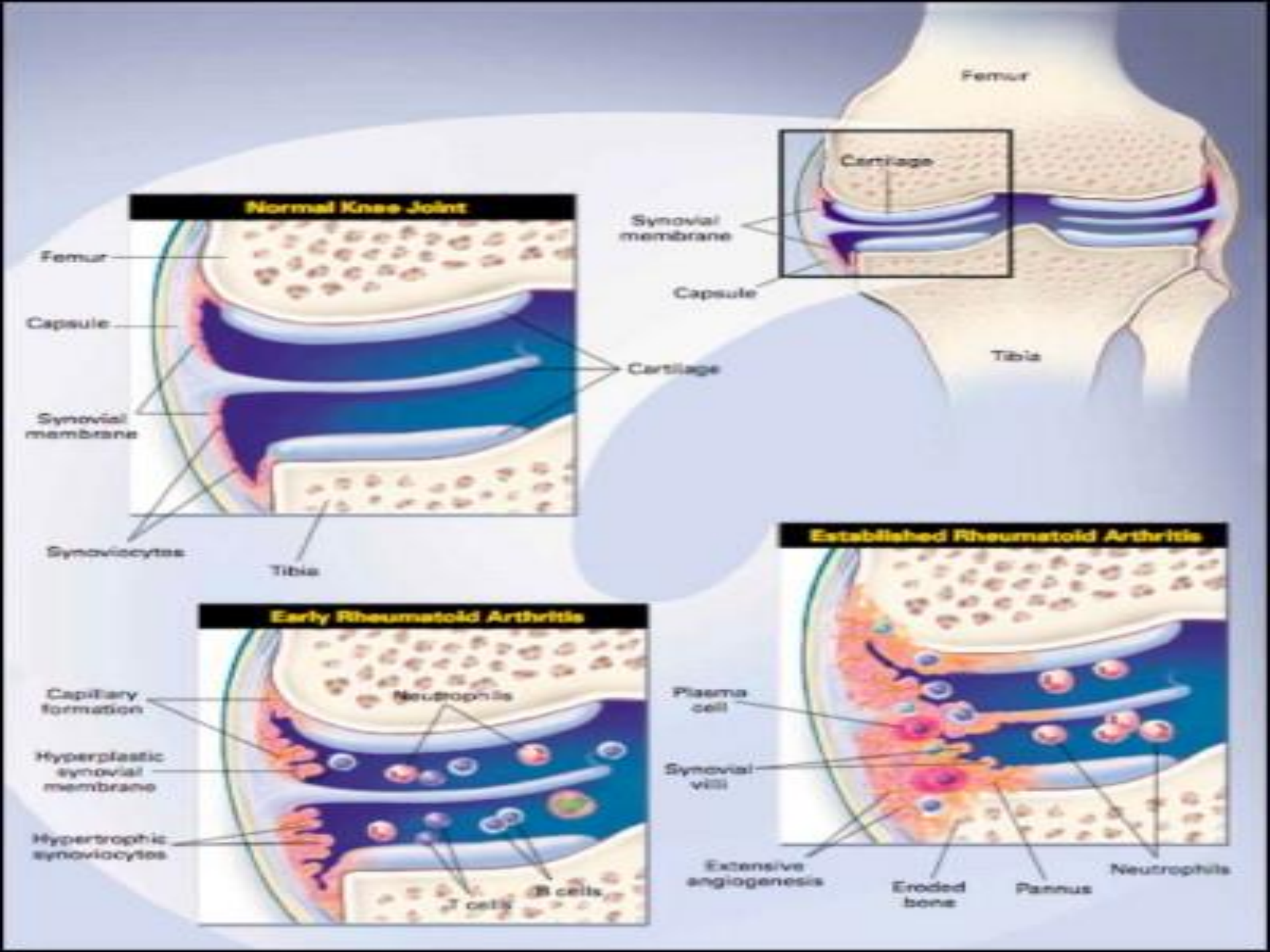
Sickle cell disease

Thalassemia

Malignant and benign tumors of bone, cartilage, or synovium

Metastatic bone disease

Hemophilia


Femur
Cartilage
Synovial membrane
Capsule
Tibia
Normal Knee Joint
Femur
Capsule
Cartilage
Synovial membrane
Synoviocytes
Tibia
Early Rheumatoid Arthritis
Capillary formation
Neutrophils
Hyperplastic synovial membrane
Hypertrophic synoviocytes
T cells
B cells
Established Rheumatoid Arthritis
Plasma cell
Synovial villi
Extensive angiogenesis
Eroded bone
Pannus
Neutrophils