

# INFLAMMATORY ARTHRITIS

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# Arthritis

## Osteoarthritis

Degeneration of joint cartilage and associated bone abnormalities. Joint fluid lab analysis typically shows no inflammatory cells

### Primary

#### Osteoarthritis

Idiopathic (spontaneous); no specific cause is known, but tends to be associated with aging

### Secondary

#### Osteoarthritis

Caused by previous injury to the affected joint; can begin at a young age

## Inflammatory Arthritis

Chronic inflammatory conditions of the body that are associated with arthritis, but often have other systemic symptoms.

### Rheumatoid Arthritis

Thought to be autoimmune, involves chronic inflammation of the synovium within the joints (usually multiple different joints on both sides of the body)

### Psoriatic Arthritis

Thought to be autoimmune and associated with psoriasis (skin condition); typically involves multiple joints.

### Crystal-Induced Arthritis

Crystal deposition in the joints

#### Gout

Caused by monosodium urate monohydrate crystals

#### Pseudogout

Caused by calcium pyrophosphate crystals

## Septic Arthritis

Life and limb-threatening bacterial infection in the joint. Requires antibiotics and emergent treatment by a physician, usually an orthopedic surgeon.

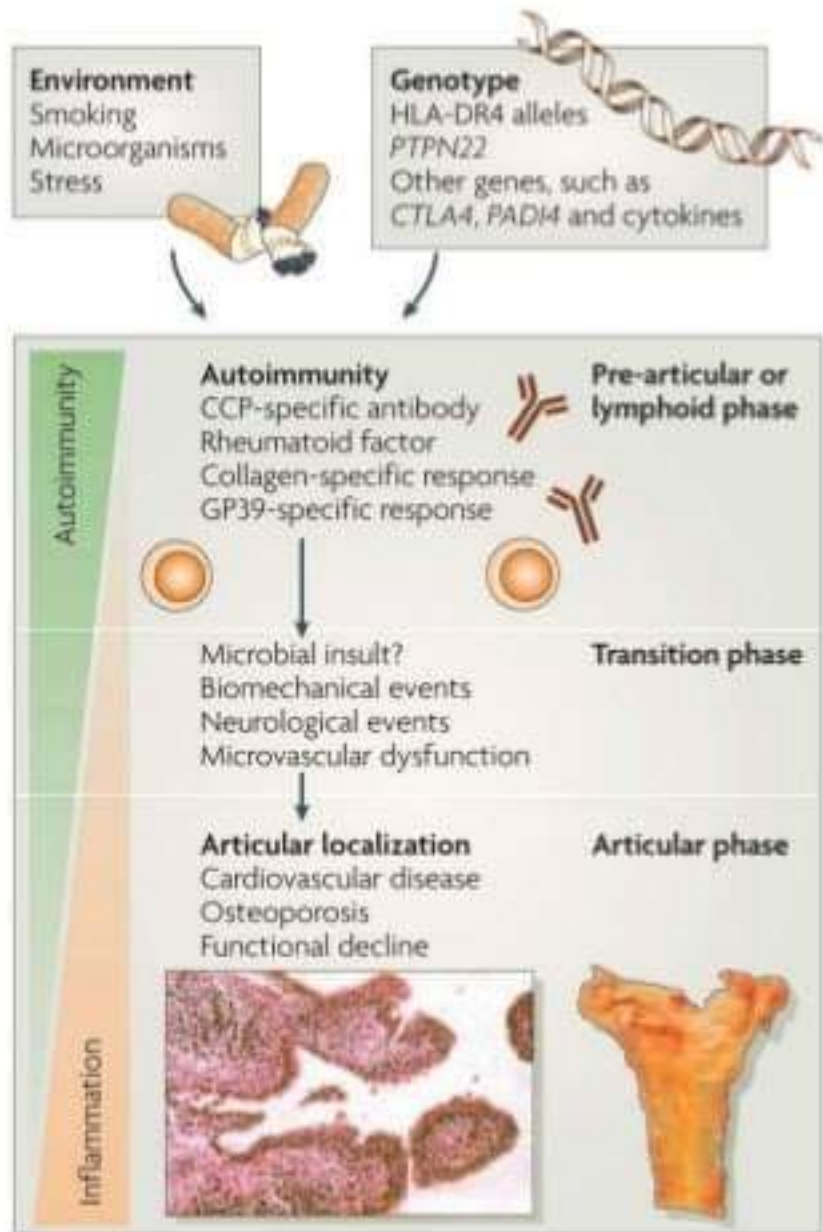
# Rheumatoid Arthritis

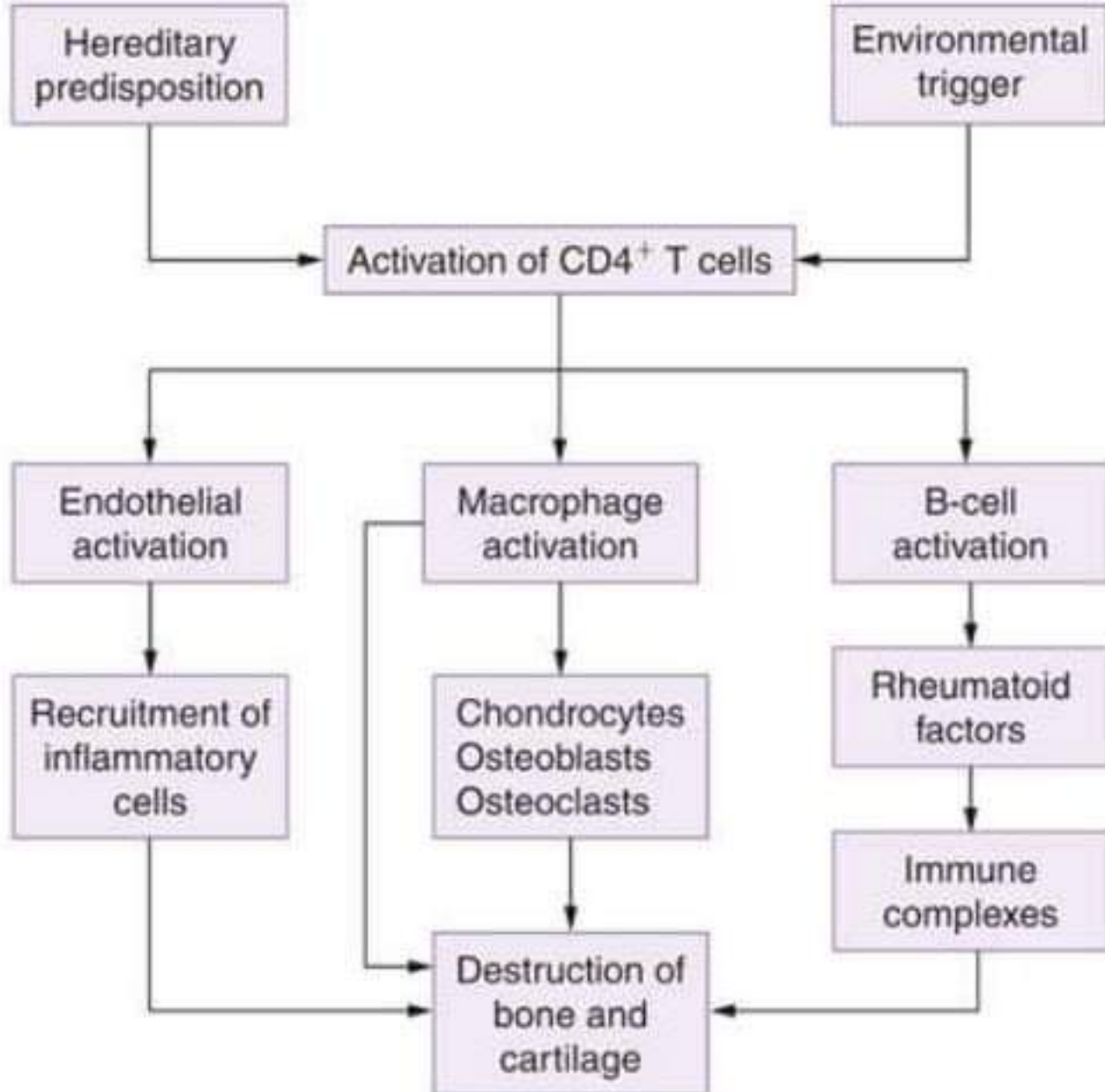
- Definition – symmetric inflammatory joint condition characterized by pannus formation, joint erosion, and systemic inflammation
- Most common inflammatory arthritis, 1% of the population, 2:1 female to male ratio, peak incidence between ages 40 to 60
- Onset usually insidious over months

# Predisposition

- Genetic factors clearly important – HLA “shared epitope” is strongest risk factor, but also non-HLA genes such as PTPN22, STAT4, TNFAIP3
- Environmental factors – cigarette smoking increases both risk of disease and severity of disease, also risk in coal miners (Kaplan syndrome)

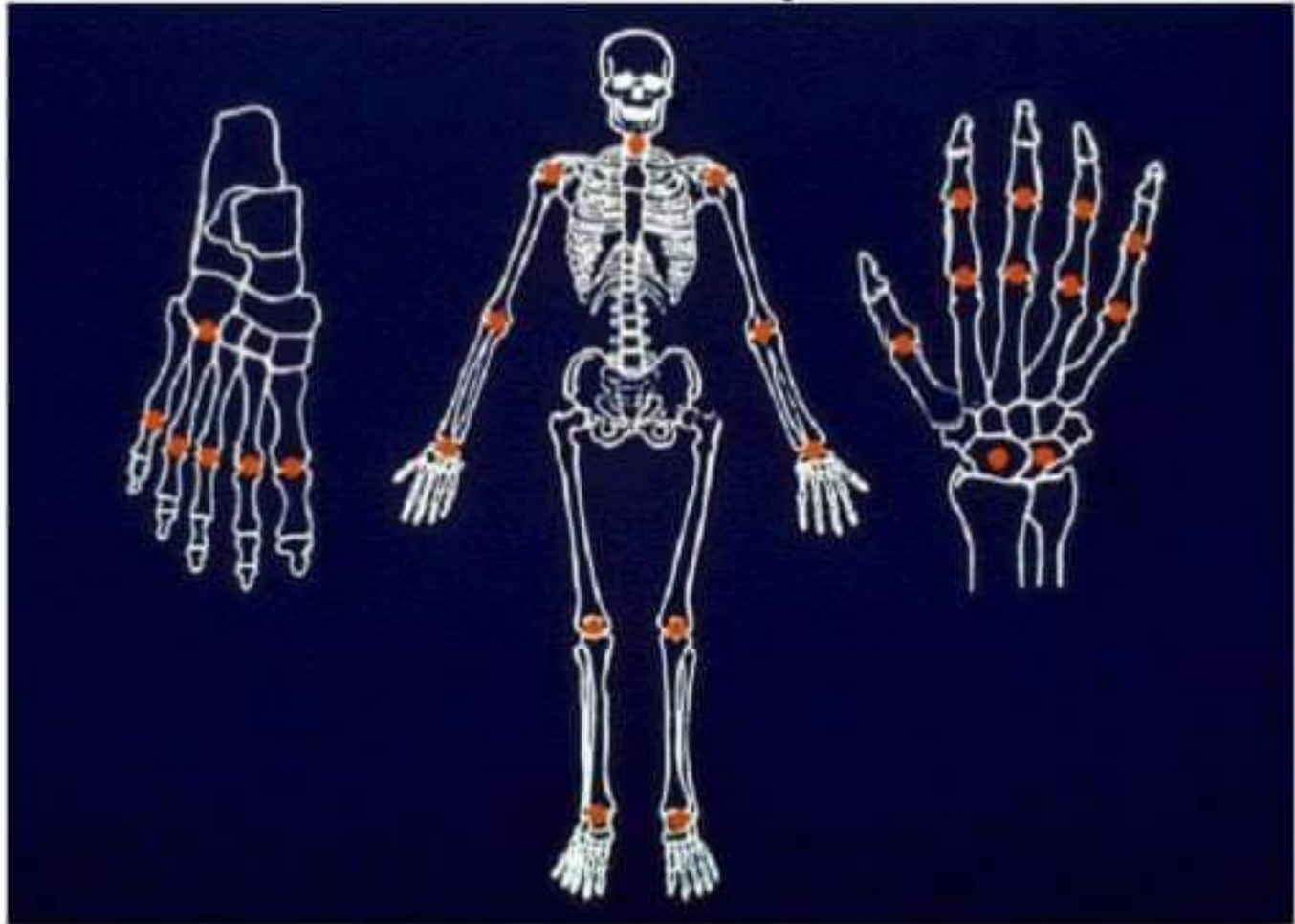
# Longitudinal Course of RA







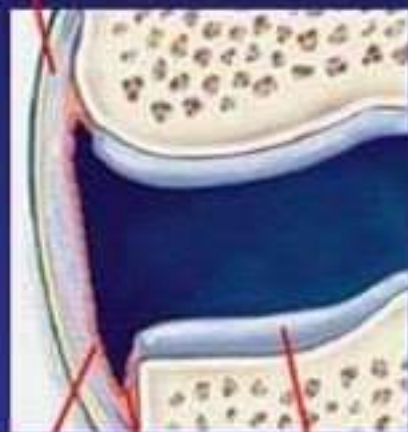
# Joints Commonly Involved



# Pathogenesis

## Normal Joint

Capsule



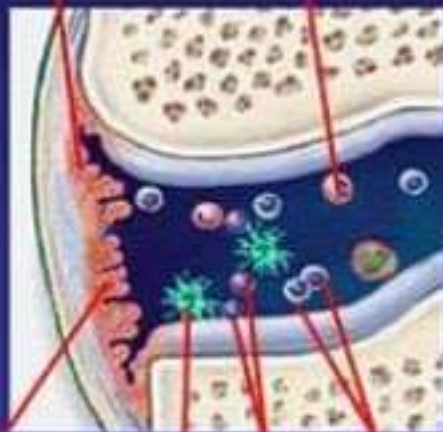
Synovial membrane

Synoviocytes Cartilage

## Early

Angiogenesis

Neutrophils



Synoviocyte accumulation

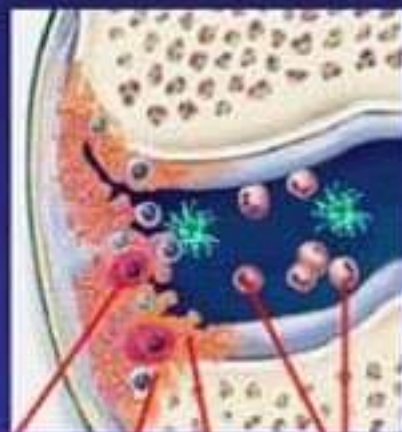
Dendritic cell

T cells

B cells

## RA

## Established



Plasma cell

Bone erosion

Pannus

Neutrophils



# Diagnosis

- History and physical are majority of diagnosis
  - Symmetric pain and swelling in small joints of hands, wrists, feet, ankles most common, followed by knees, elbows, shoulders
  - Morning stiffness – better with activity
  - Constitutional symptoms – fatigue, even weight loss are common, but fever is VERY RARE
  - Steady, progressive, additive onset is by far most common presentation

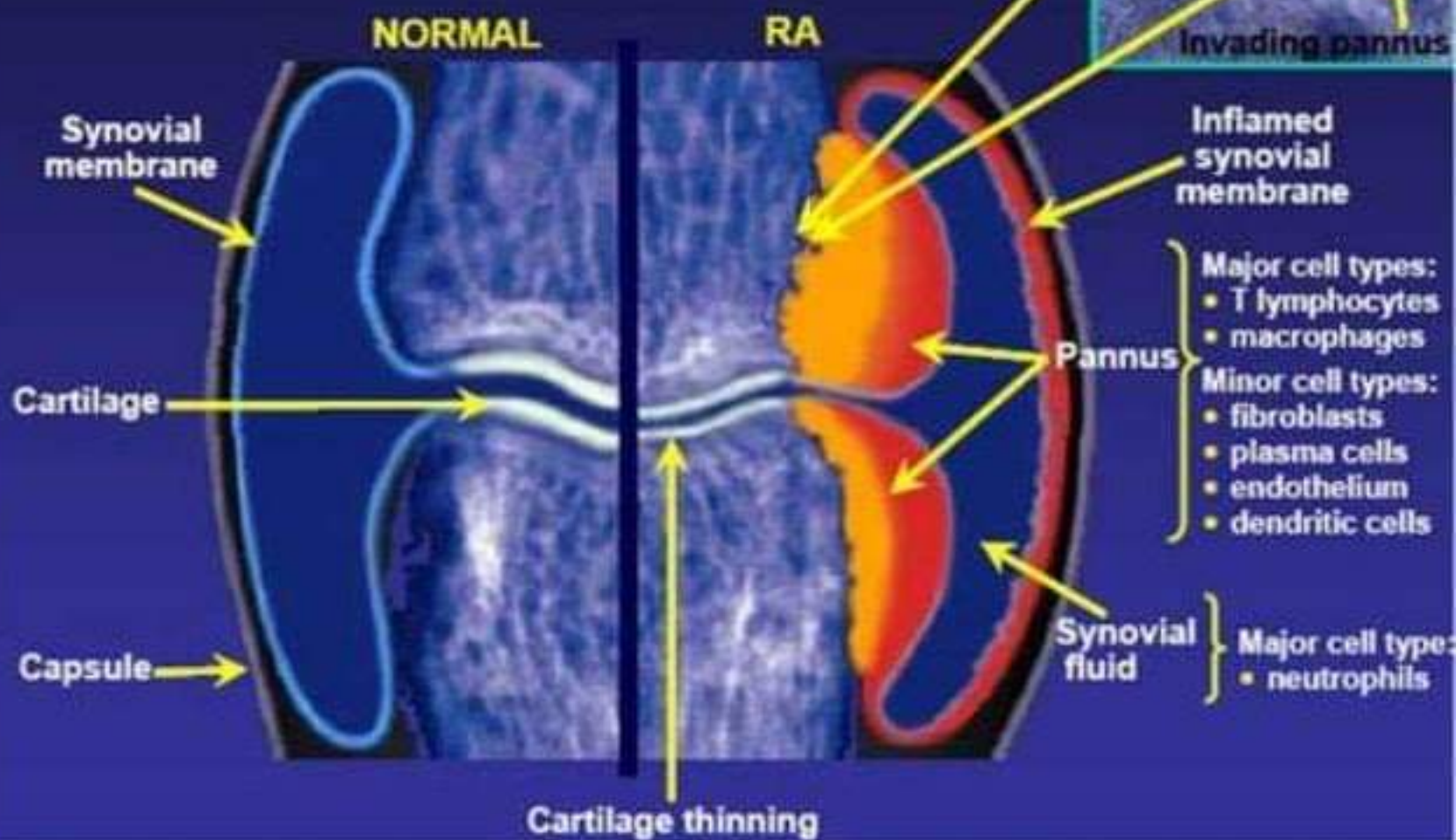
## 1987 Classification Criteria for Rheumatoid Arthritis



- **Morning stiffness**
  - Longer than 1 hour
- **Arthritis of 3 or more joints**
  - Accompanied by swelling
- **Arthritis of hand joints**
  - At least 1 joint with swelling
- **Symmetric arthritis**
  - Same joint areas on both sides of body
- **Rheumatoid nodules**
  - Subcutaneous nodules over bone or extensor surfaces
- **Radiographic changes**
  - Erosions
  - Boney decalcification
- **Seropositivity**
  - Rheumatoid factor (RF)

At least 4 out of the 7 criteria must be present to classify patient as having RA

# The rheumatoid joint



# Patterns of Onset

<b>Insidious</b>	55%-65%	Joint stiffness, swelling, pain, fatigue
<b>Acute</b>	8%-15%	Fever, weight loss, fatigue, joint abnormalities present but often not prominent
<b>Intermediate</b>	15%-20%	Systemic complaints more noticeable than insidious onset



# Stages of RA

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Early RA



Intermediate RA



Late RA





# Cycle of Deformity

Prolonged Joint Inflammation



Supporting joint ligaments become loose.



Tendons become misaligned.



Successive joints "buckle".



Zigzag deformity



Misaligned tendons pull joints into direction of increased deformity.



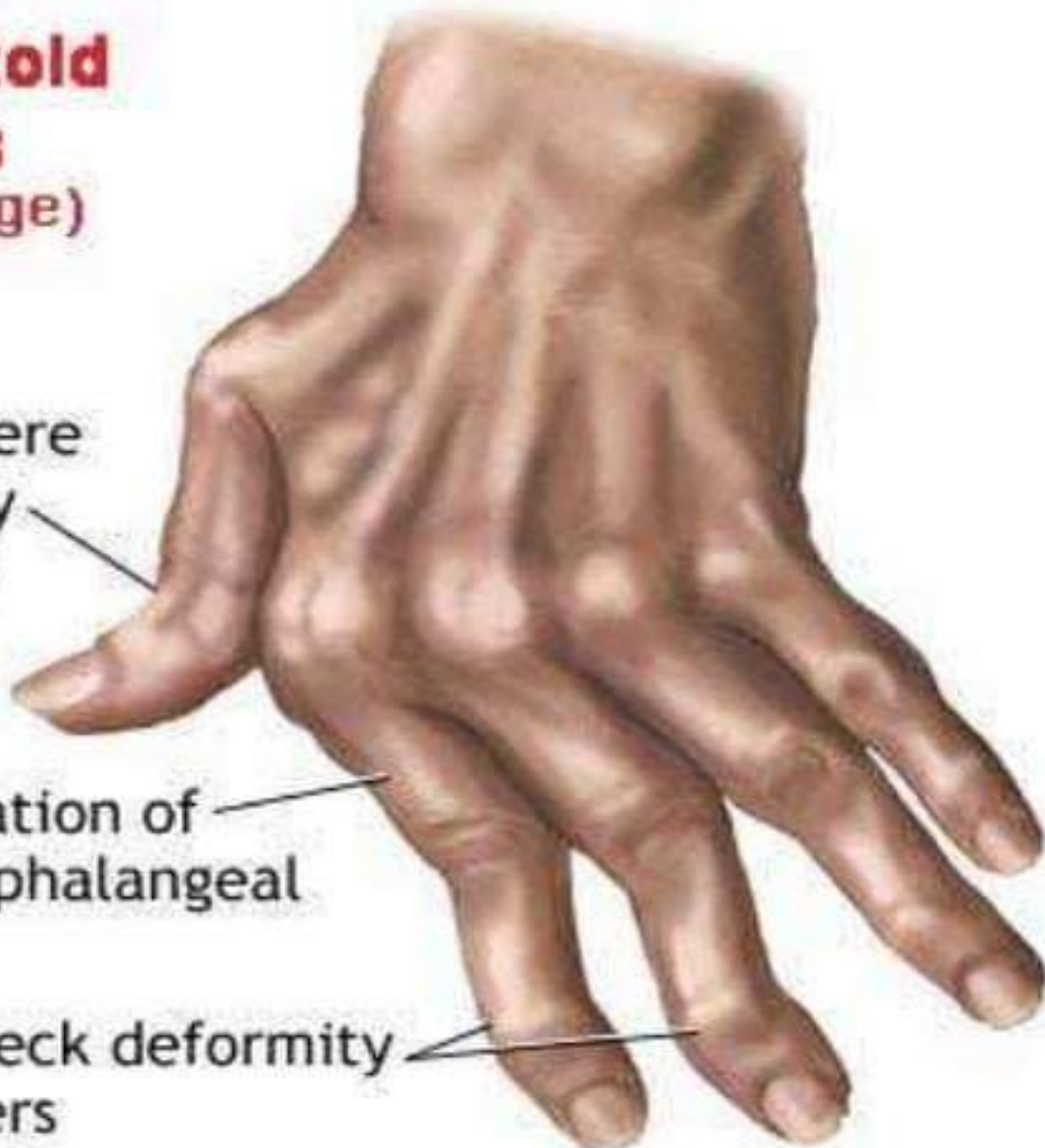
Aggravation of joint deformities due to daily resistive hand use.  
(Deforming forces)

**Rheumatoid  
Arthritis**  
(Late stage)

Boutonniere  
deformity  
of thumb

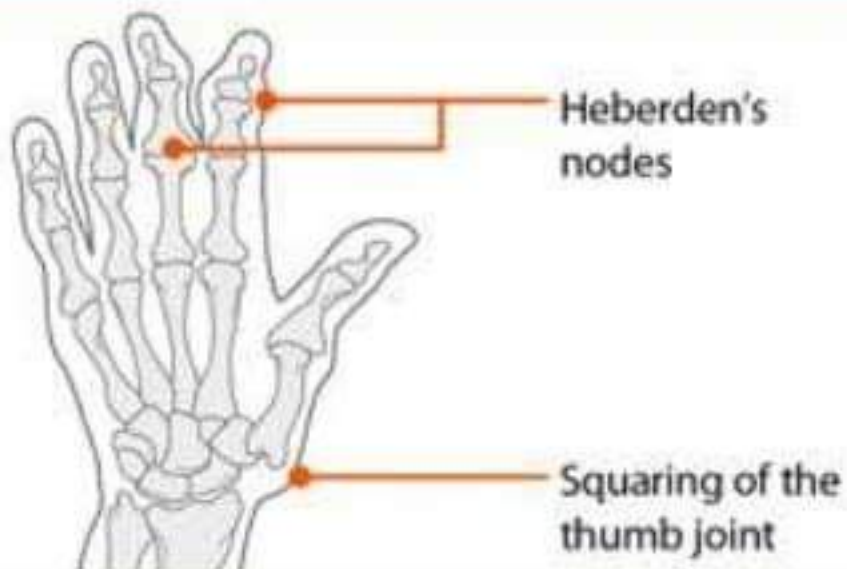
Ulnar deviation of  
metacarpophalangeal  
joints

Swan-neck deformity  
of fingers

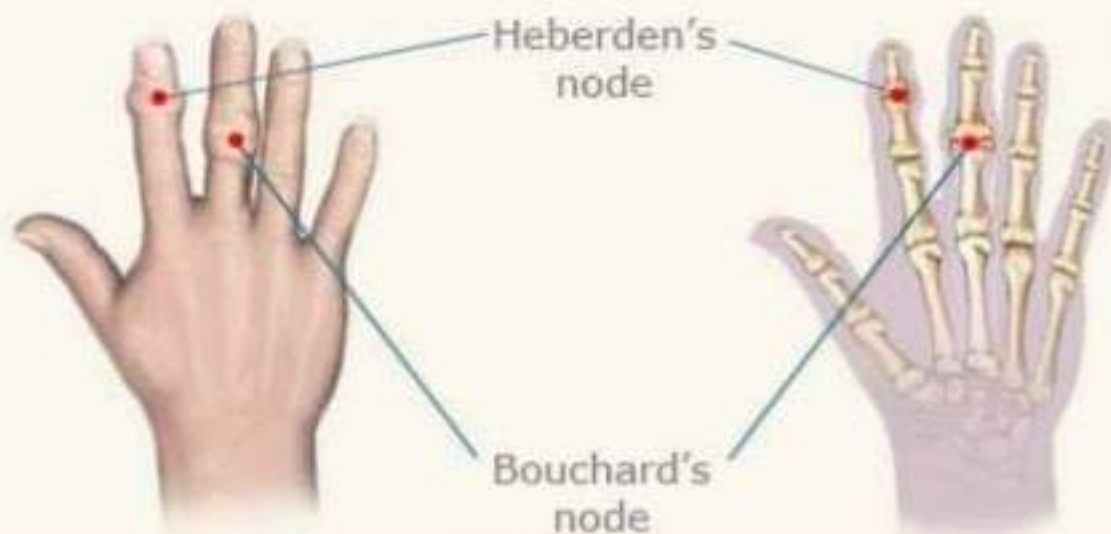


Typical hand  
deformities in  
rheumatoid  
arthritis





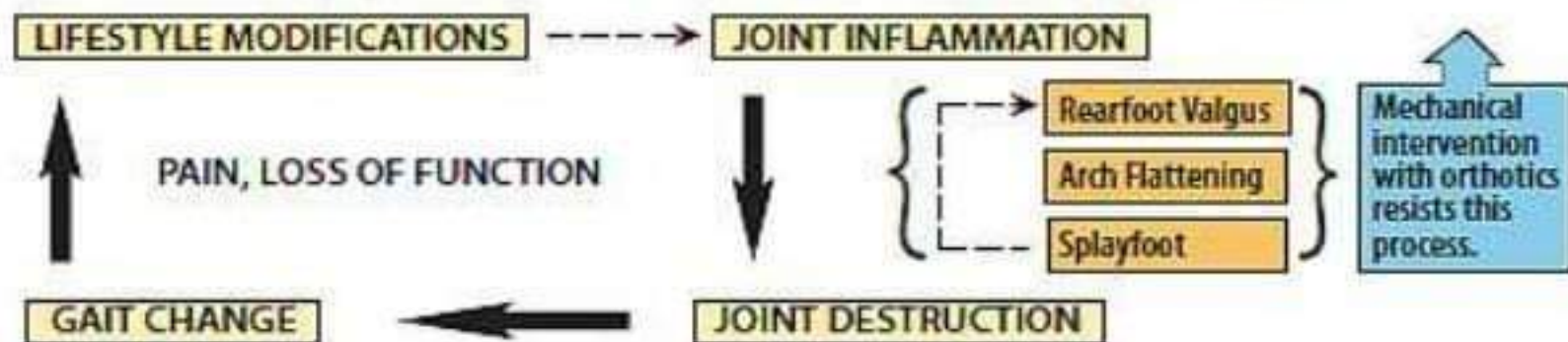
**Typical hand  
deformities in  
osteoarthritis**







## Eighty-five Percent of RA Patients Develop Foot Pain





## Extra-articular features

- Rheumatoid nodules
- Pleural effusions
- Atherosclerosis (new, but probably testable)
- Scleritis
- Rheumatoid vasculitis (rare)
- Felty's syndrome (neutropenia, splenomegaly, recurrent infection)

**Rheumatoid nodules**



# Felty's Syndrome Components

*Mnemonic: "SANTA"*

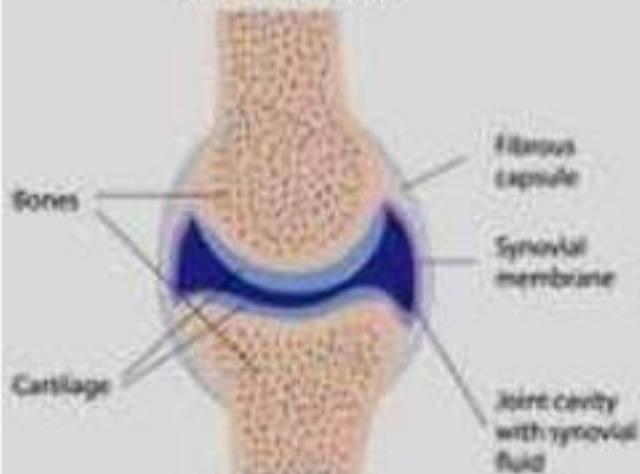


S	<b>Splenomegaly</b>
A	<b>Anemia</b>
N	<b>Neutropenia</b>
T	<b>Thrombocytopenia</b>
A	<b>Arthritis (Rheumatoid)</b>

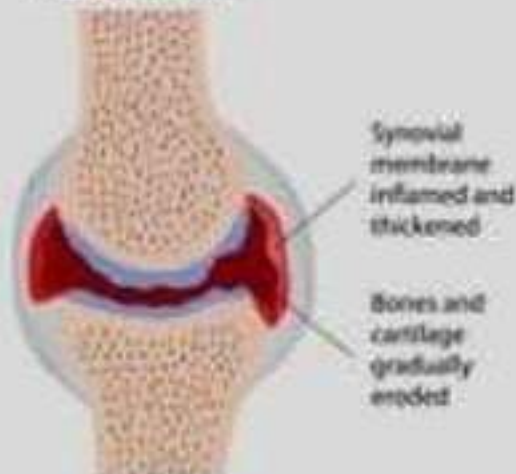
Felty syndrome is a rare condition that involves rheumatoid arthritis, decreased white blood cell count, and a swollen spleen.

# Stages of Rheumatoid Arthritis

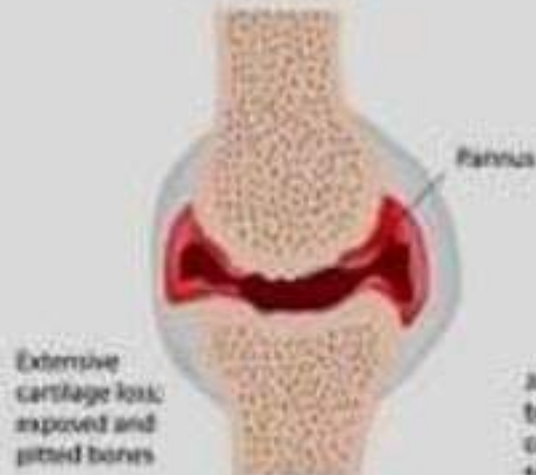
**Healthy joint**



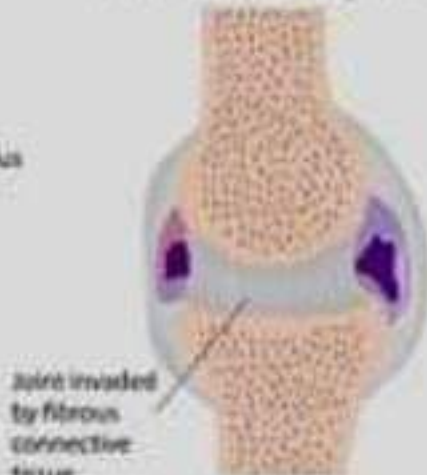
**1. Synovitis**



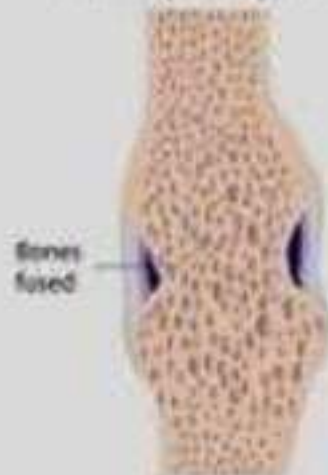
**2. Pannus**



**3. Fibrous ankylosis**



**4. Bony ankylosis**



# Laboratory

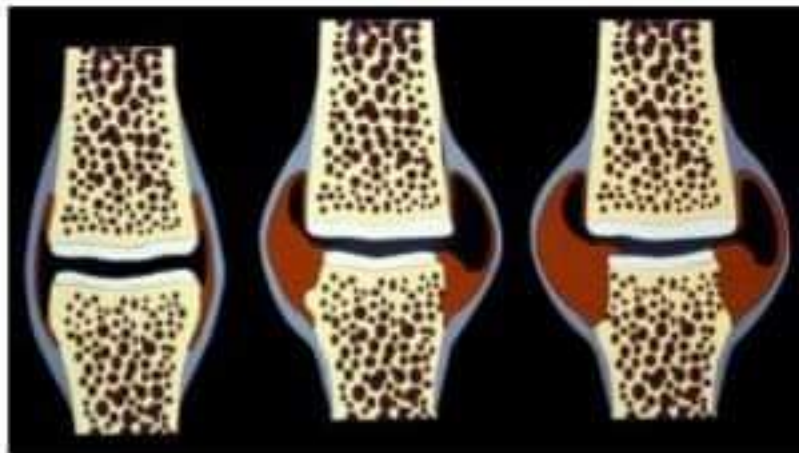
- High ESR or CRP common but not required
- Rheumatoid factor positive in about 50%
  - RF usually indicates more severe disease, greater likelihood of extra-articular manifestations
- Anti-CCP antibodies - relatively new (but very clinically useful and testable!!)
  - Found in about 50% of patients without much overlap with rheumatoid factor
  - Highly sensitive – positive test almost always indicates disease (>90% specificity for RA, even in mixed autoimmune cohorts)



## X-ray

- Classical findings of inflammatory arthritis:
  - Periarticular joint erosions
  - Periarticular osteopenia
  - Symmetric joint space narrowing
- Note that each of these is the opposite of OA!!
  - (erosions instead of spurs, osteopenia instead of sclerosis, and symmetric instead of asymmetric joint narrowing)

## Early Radiographic Progression



Joint-space narrowing and erosion are seen in up to two thirds of patients within the first 2 to 5 years of disease





Rheumatoid  
arthritis  
erosions on  
X-ray

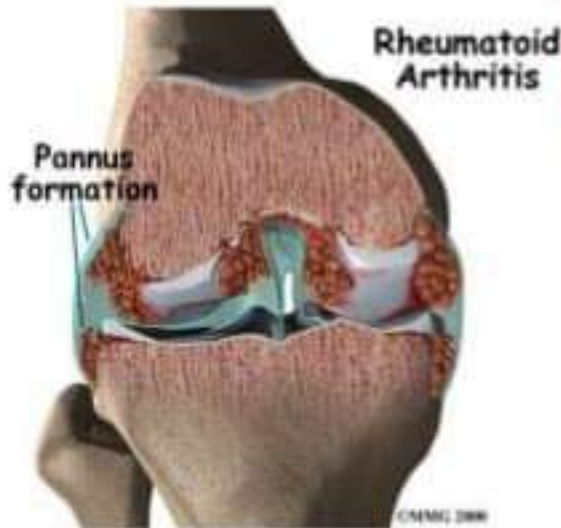


**Periarticular osteopenia**

# RHEUM. ARTHRITIS - Late changes

## ADVANCED JOINT CHANGES:

- Joint destruction
- Pain
- Deformity
- Instability





# Treatment

- Early treatment with a disease modifying drug is standard of care
- Non-disease modifying
  - NSAIDs
  - Prednisone
- Disease modifying
  - Methotrexate – most common first line, usually around 15-20mg/week with daily folate 1mg/day
  - Sulfasalazine, leflunomide also effective
  - Biological agents such as TNF-alpha blockers, abatacept, rituximab, and tocilizumab are all second or third line

# Treatment

- Goal of treatment is clinical remission if possible
- Control of disease prevents bone erosions and subsequent deformity and loss of function
- All disease modifying drugs are immunosuppressive, non-biologics have risk of GI intolerance and hair loss, TNF blockers are associated with re-activation of tuberculosis and rarely an MS-like disease, other biologics are not currently in wide use