

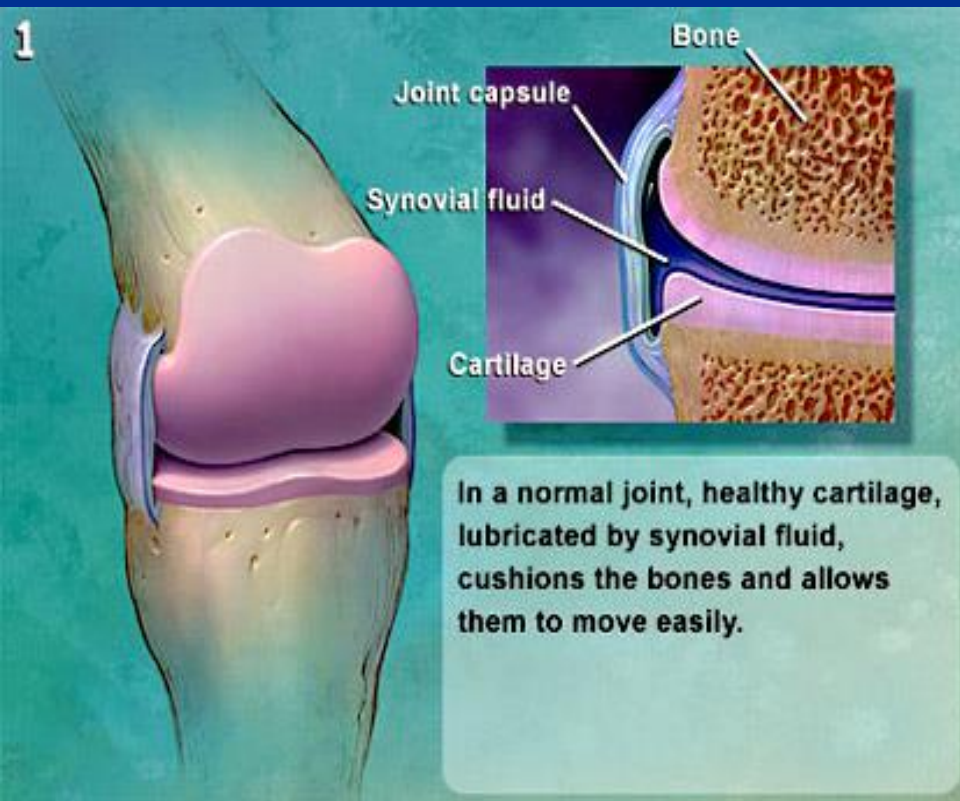


IN THE NAME OF GOD

- Osteoarthritis is a common and disabling condition that represents a substantial and increasing health burden with notable implications for the individuals affected, health-care systems, and wider socioeconomic costs
- OA is joint failure, hyalialn cartilage loss, sclerosis, osteophyte,
- First step: failure chondroprotective mechanism

OSTEOARTHRITIS:

disease of whole joint organ



EPIDEMIOLOGY

EPIDEMIOLOGY

- Most common type of arthritis
- Most common musculoskeletal disease
- A leading cause of disability in elderly
- ↑ Prevalence:
 - ↑ Aging
 - ↑ Obesity

- Ageing and increasing obesity in the global population, along with increasing numbers of joint injuries, this already burdensome syndrome is becoming more prevalent, with worldwide estimates suggesting that 250 million people are currently affected

Epidemiology

- Clinically, the knee is the most common site of osteoarthritis, followed by the hand and hip

EPIDEMIOLOGY

■ Symptomatic knee OA:

- >30y → 6%
- >60y → 12%

EPIDEMIOLOGY

The most common cause of chronic knee pain in >45

Symptomatic hand OA:

- 10% of elderly

- Hip OA: one-third as common as knee OA

- Correlate strikingly with age:

- <40y → Uncommon

- Sex:

- More common in women (hand and knee)
- ↑ Sex differences with age

JOINT PROTECTORS

PROTECTORS

■ Capsule and ligaments:

- Limits excursion

■ Muscles and tendons:

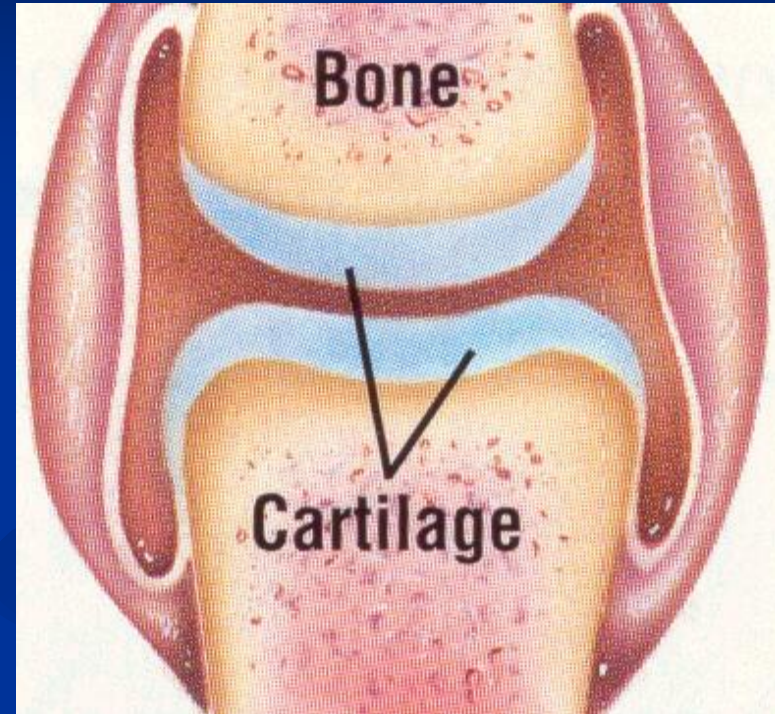
- Key protector

- Function:

- Appropriate power

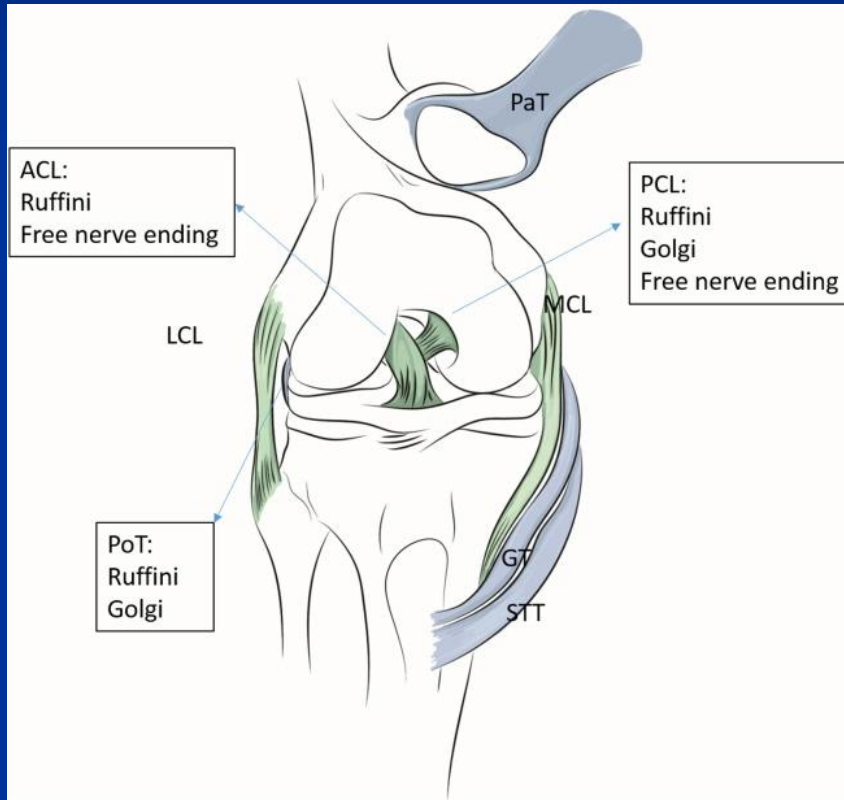
-  Focal stress by:

- Decelerate joint
- Distribute across joint surface



Mechanoreceptors of ligament and tendon in knee

- Charcot's arthropathy
- Rupture ligament



PROTECTORS

■ Mechanoreceptor:

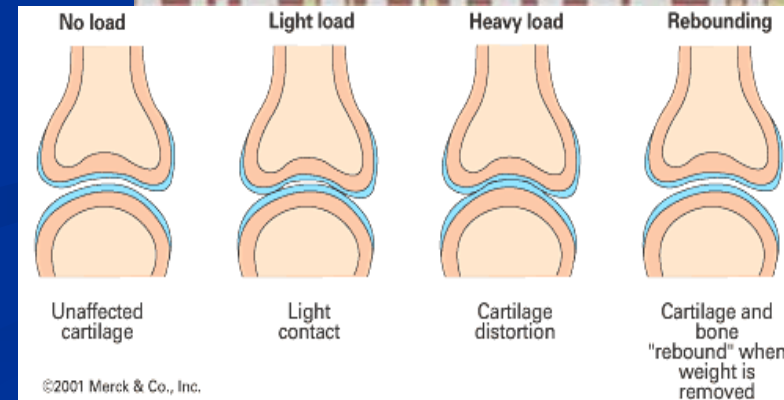
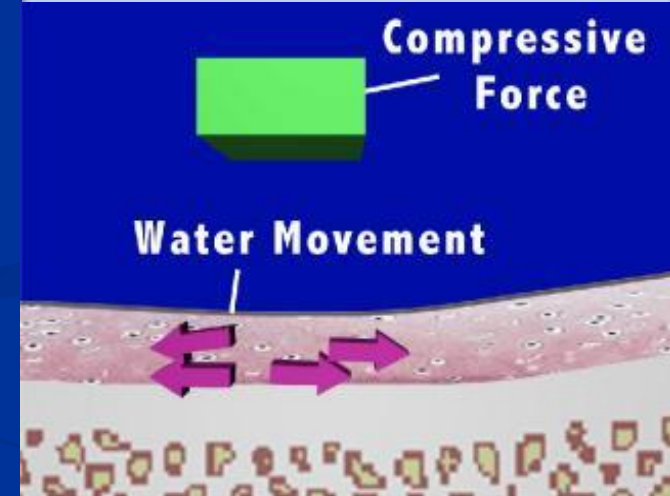
- In ligament, skin and tendon
- Assume appropriate tension

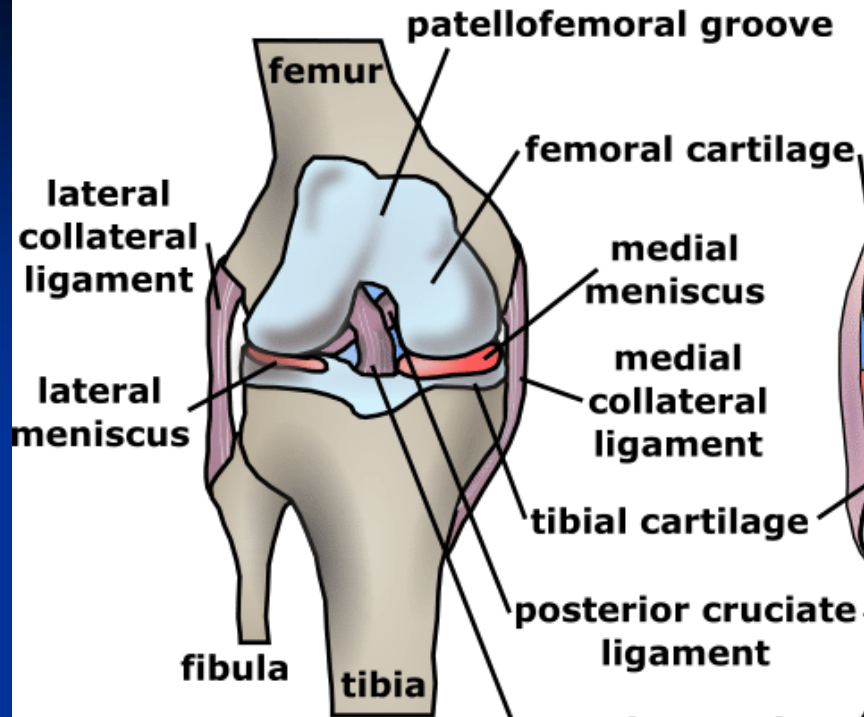
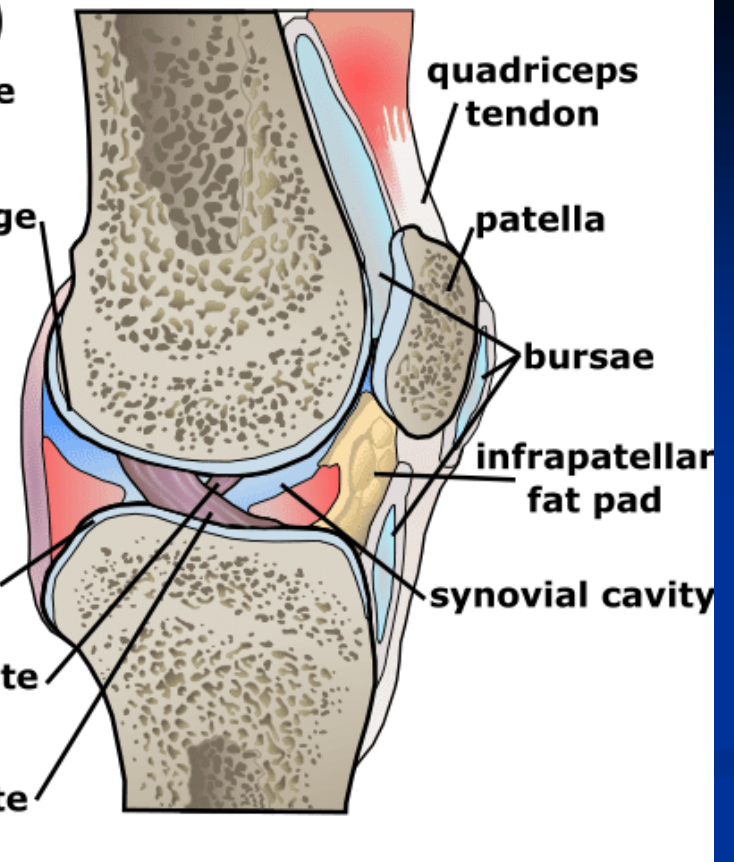
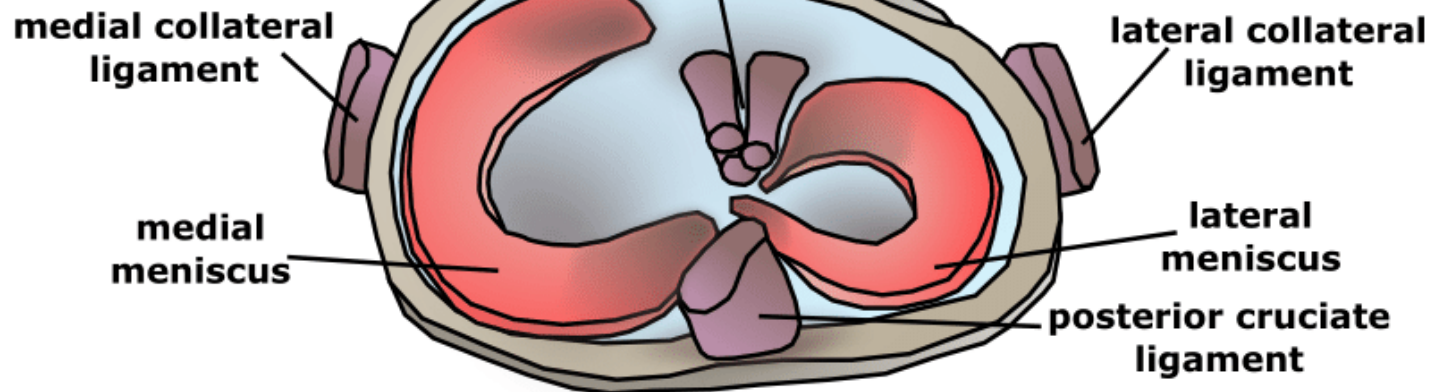
■ Synovial fluid:

- ↓ Friction

■ Subchondral bone

- Shock-absorber



A)**B)****C)**

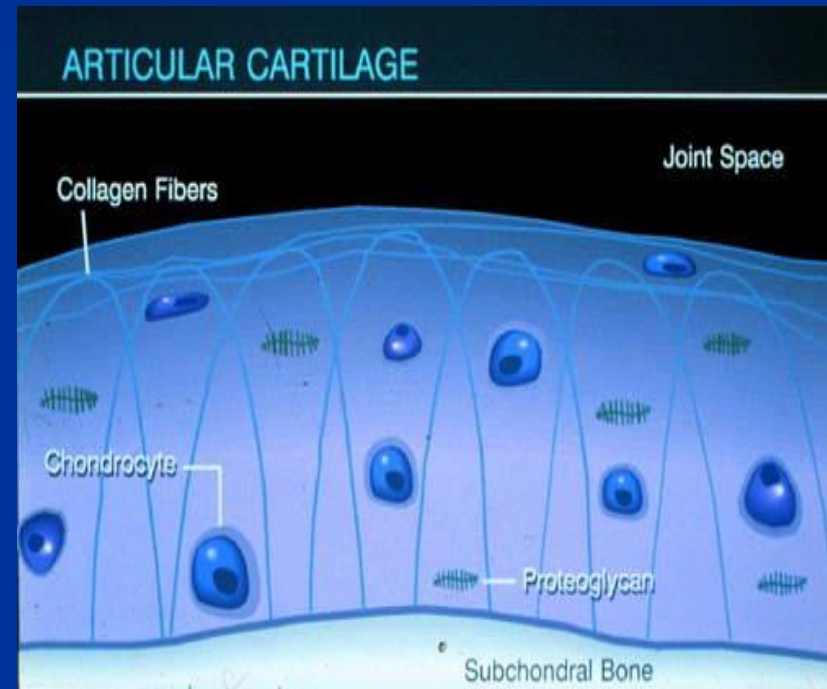
PROTECTORS

■ Cartilage:

- A thin rim of tissue
- Lubricate by synovial fluid

● Function:

- Frictionless surface
- Absorbing capacity

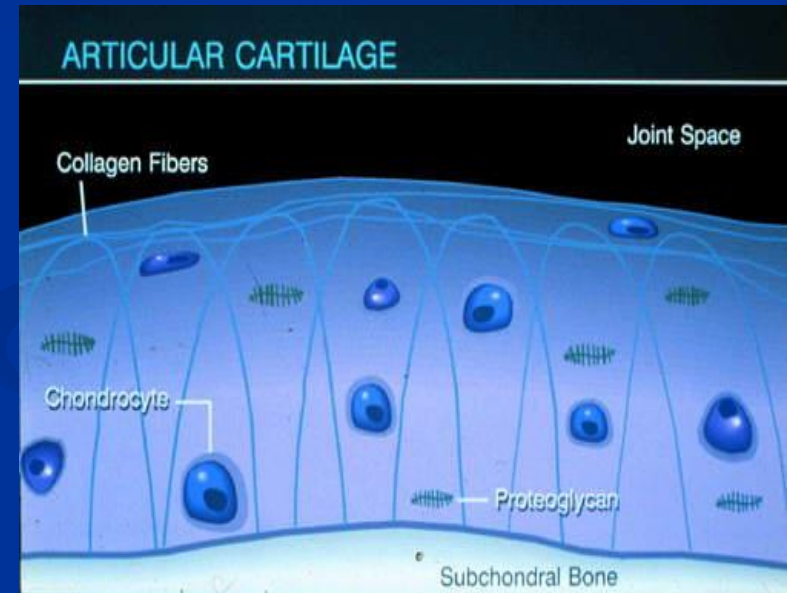


PROTECTORS

■ Chondrocyte:

- Synthesize all element of matrix
- Secret:
 - Growth factors
 - Cytokines (MMP...)

Function in dynamic equilibrium



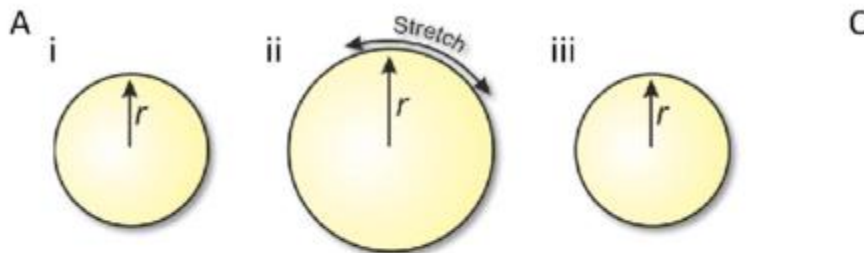
PATHOPHYSIOLOGY

PATHOPHYSIOLOGY

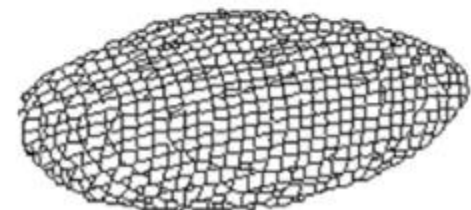
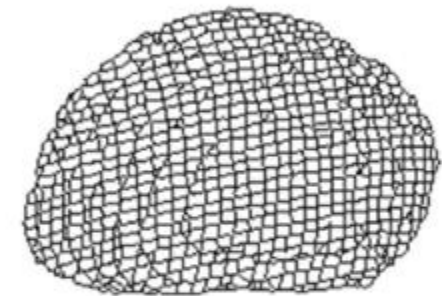
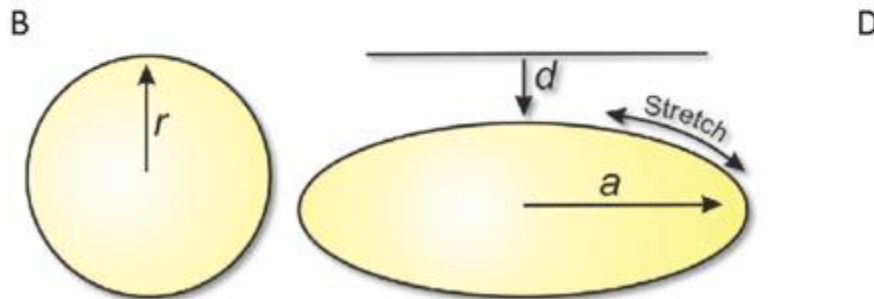
- Joint failure
- Initial step: failure of protective mechanisms
- Pathologic change in all structures of joint
- Hallmark: hyaline cartilage loss

Mechanical and osmotic stress change chondrocyte:

Osmotic challenge (load, disease and ageing)



Compression (load)

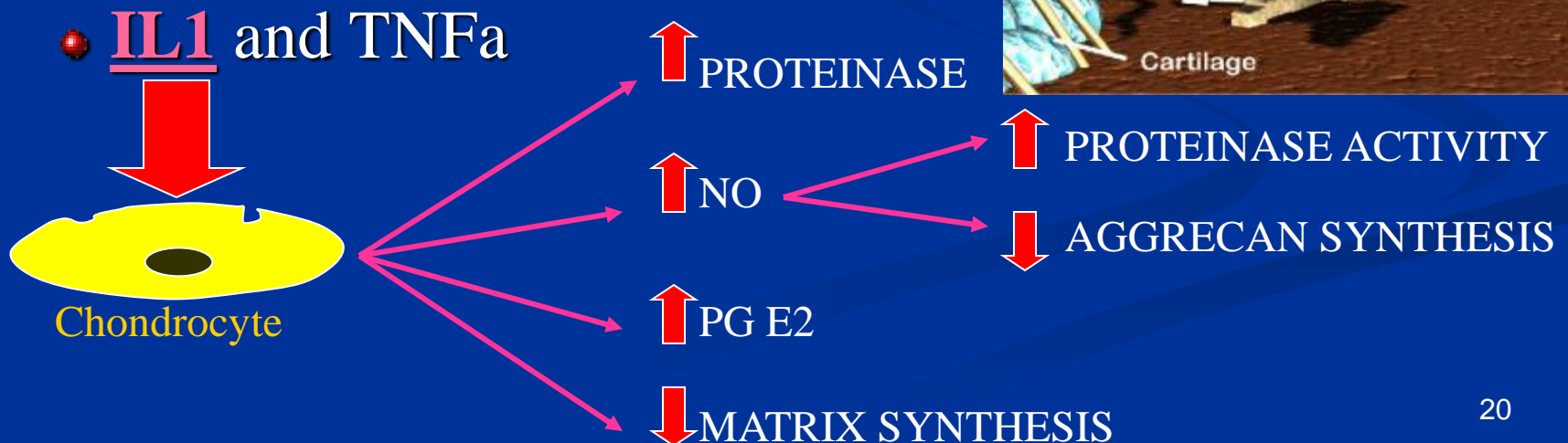


PATHOPHYSIOLOGY

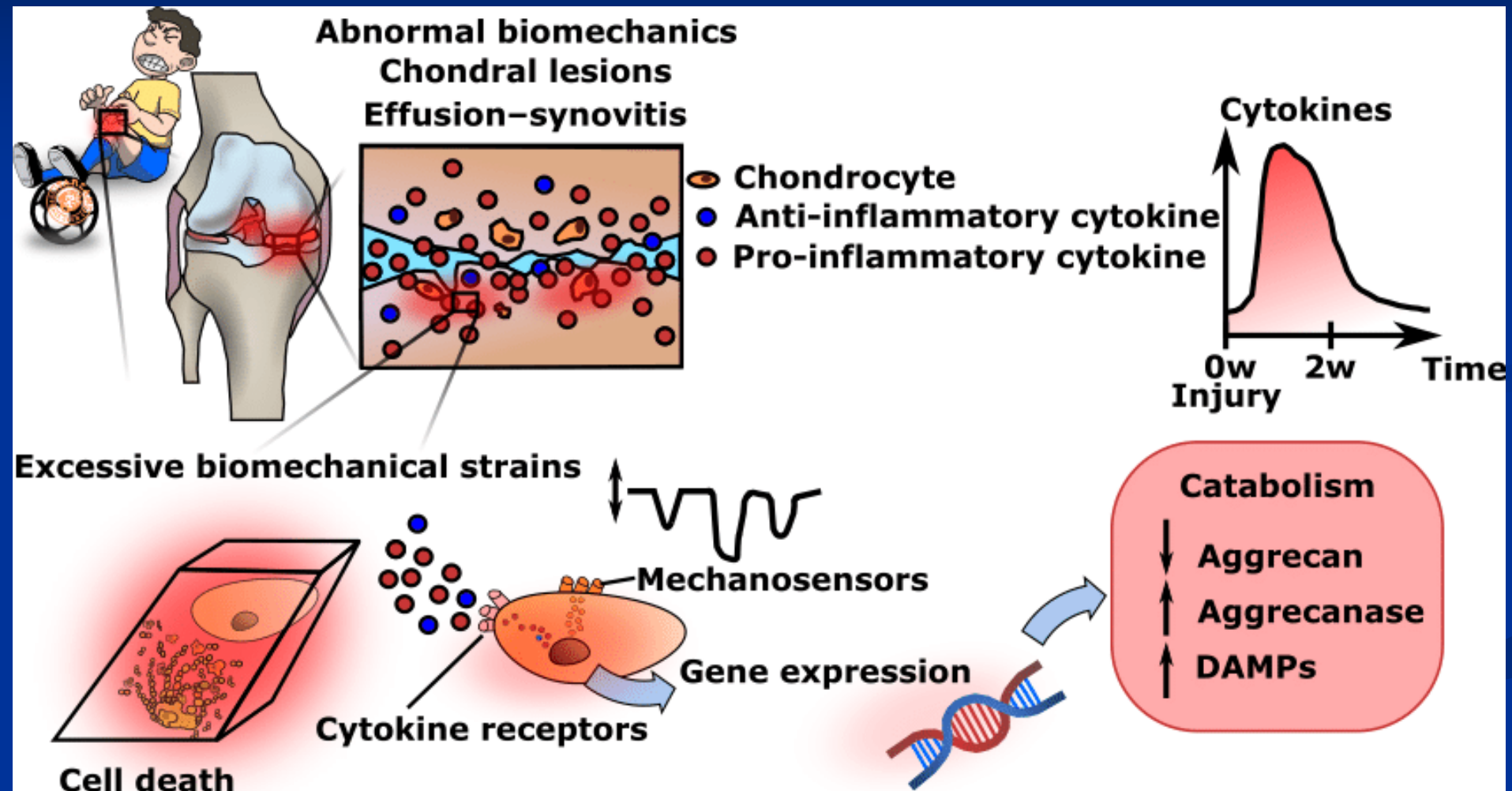
■ Chondrocytes:

- ↑ Metabolic activity, ↑↑↑ catabolic activity → ↓ PG
- ↑ Apoptosis

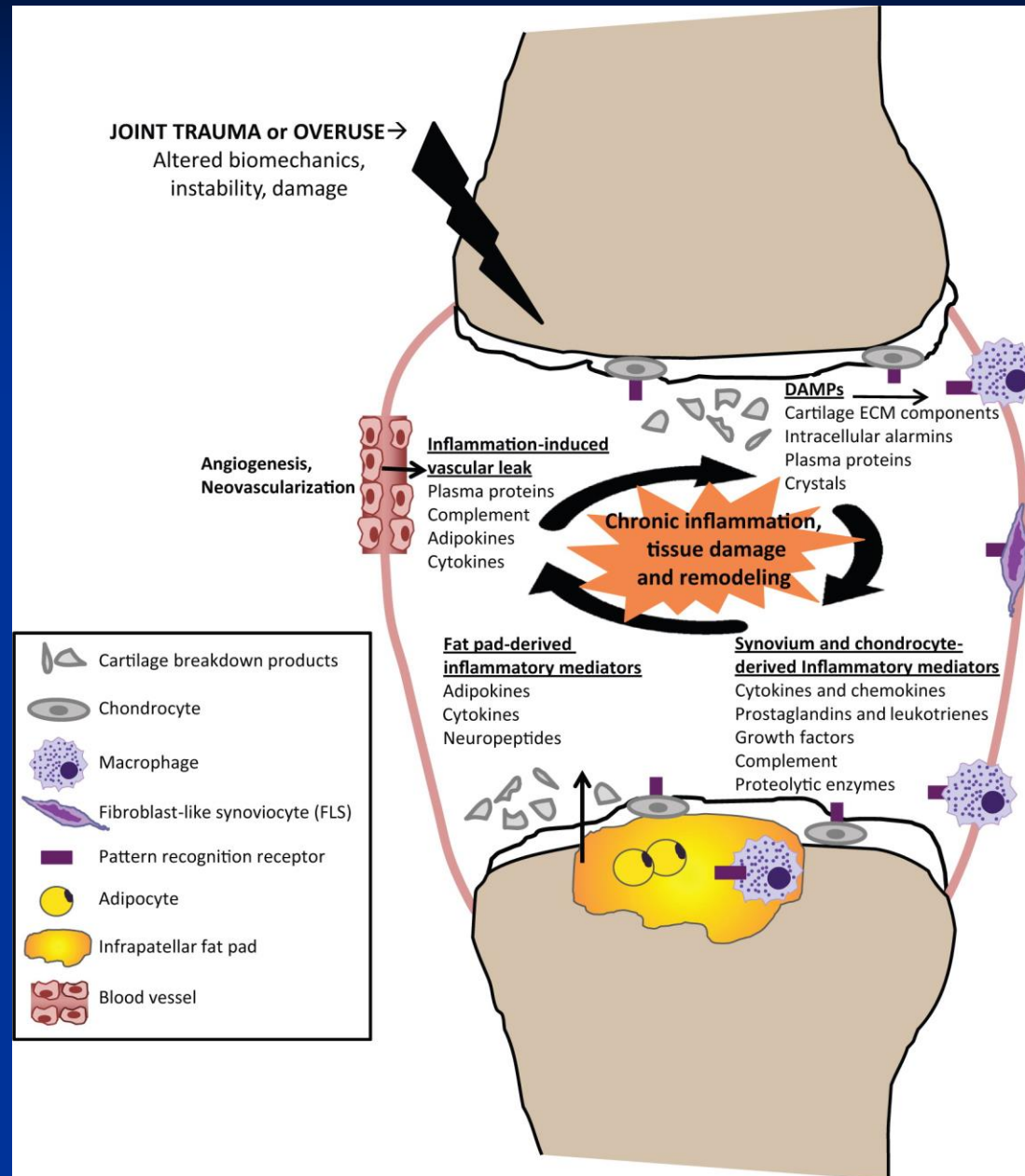
■ Chondrocytes and synovium:



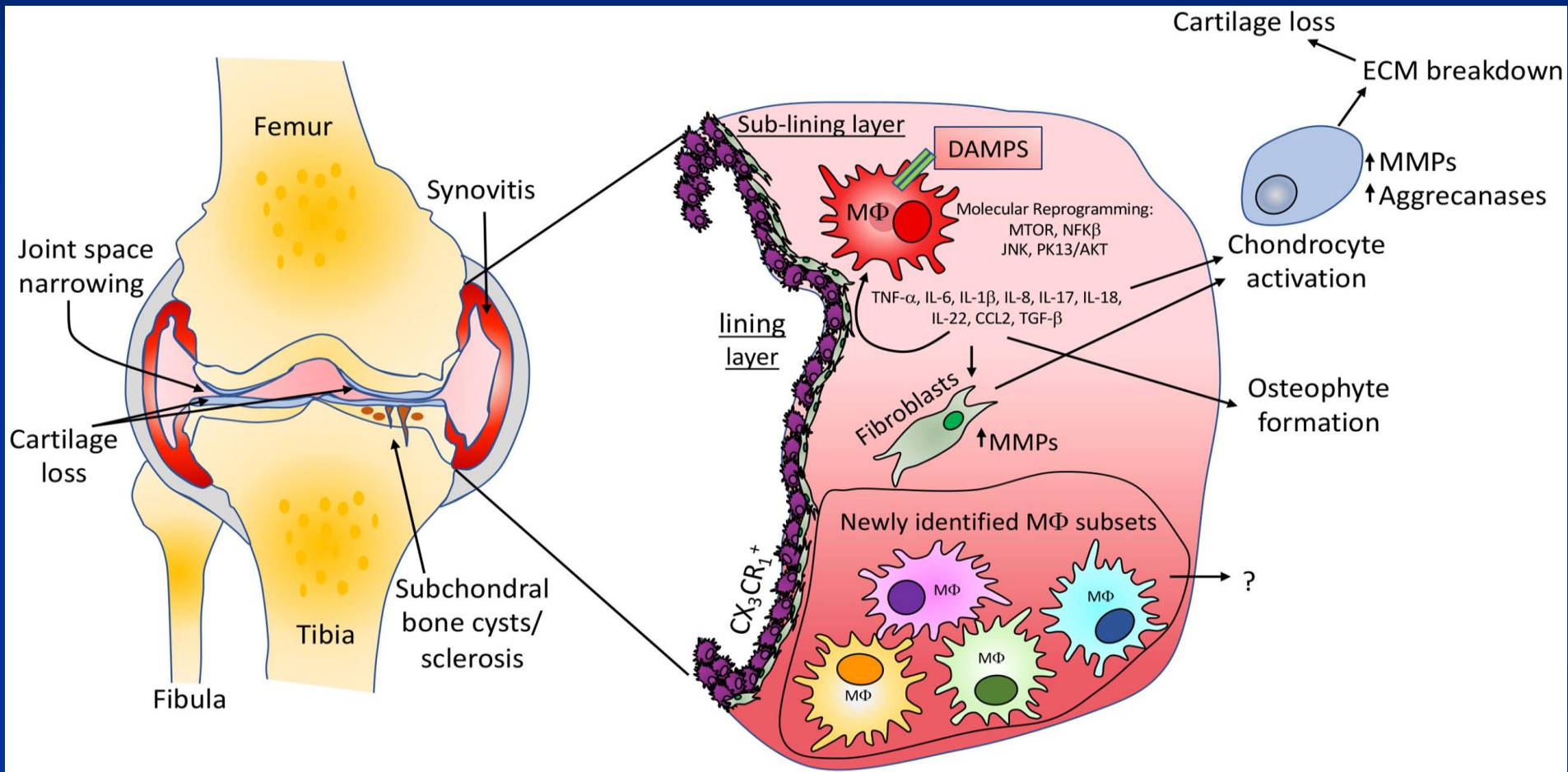
Mechano-inflammation

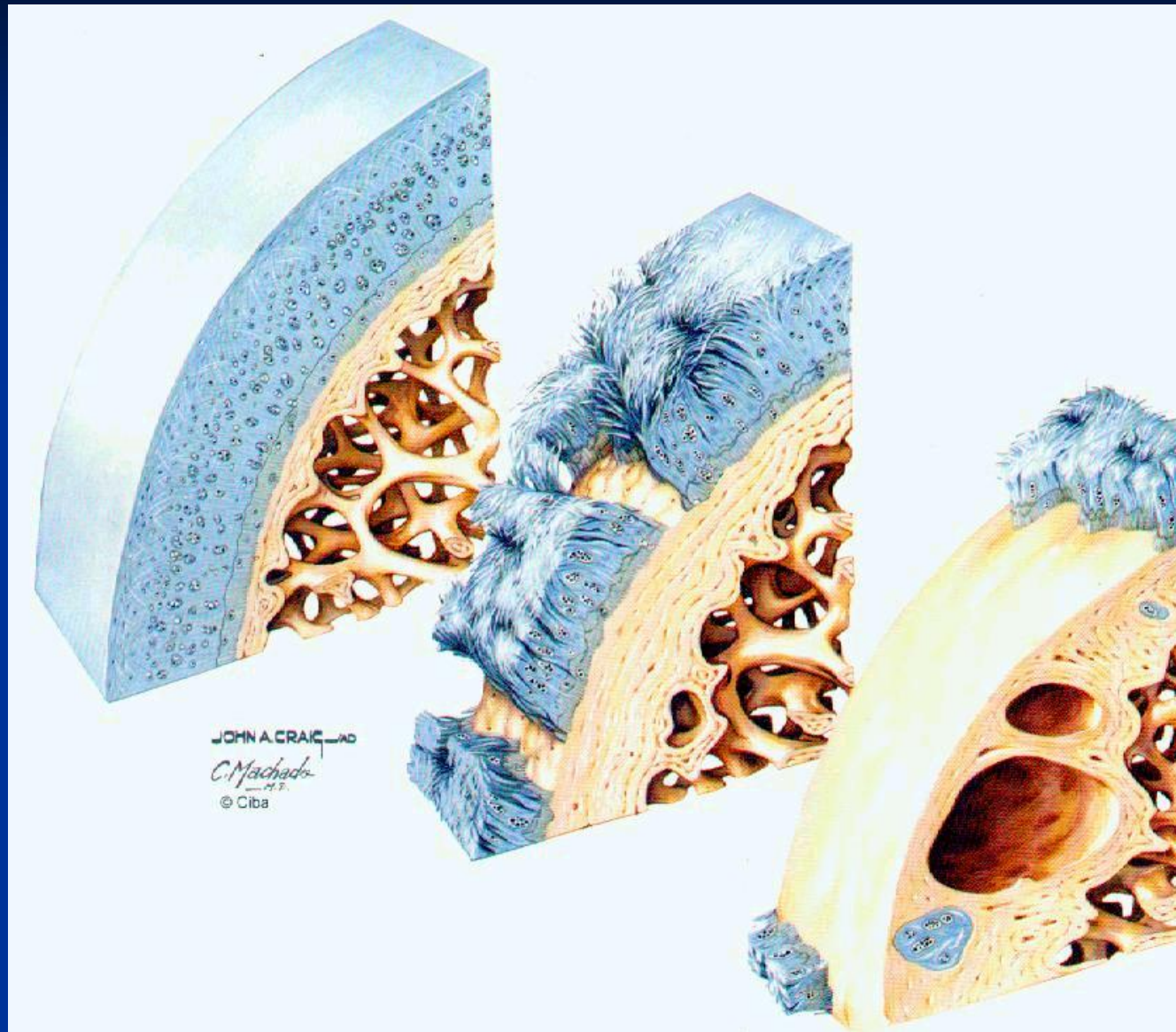


Inflammation in osteoarthritis



Inflammation in osteoarthritis





RISK FACTORS

RISK FACTORS

■ AGE:

- Most potent age more 70 years 50%
- Mechanisms:
 - ✗ ↓ Matrix synthesis → Thin cartilage then shear stress
 - ✗ Muscles:
 - Weaker
 - Less quickly response
 - ✗ Slow sensory impute
 - ✗ Ligament stretch make less absorb impulse

RISK FACTORS

■ OBESITY:

- Knee in stance → 3-6 times of weight
- ↑ Knee OA and less for hip and hand OA
- Women: Stronger (linear)
- ↑ Symptom
- Mechanisms: - Loading
 - Low grade systemic inflammation₂₇

RISK FACTORS

■ FEMALE

■ GENETIC (OA in member):

- Hand & Hip → 50%
- Knee → 30%
- Polymorphism in growth differentiation factor 5 (GDF5)

RISK FACTORS

■ JOINT:

- Developmental : Hip : congenital dysplasia more in girls, Legg-Perthes, slipped capital epiphysis
- Fracture : like ankle, wrist
- Tear of ligament and meniscus
- Malalignment

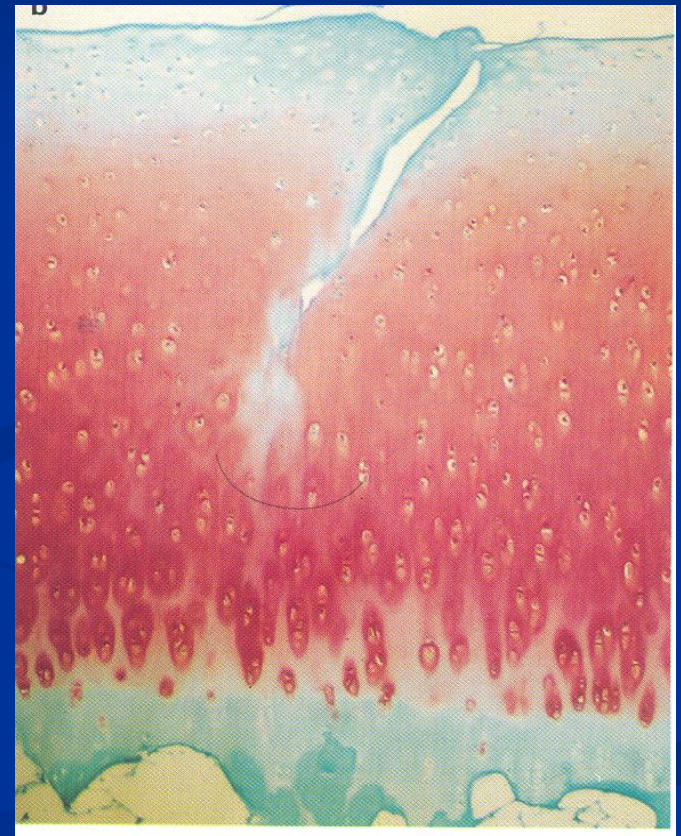
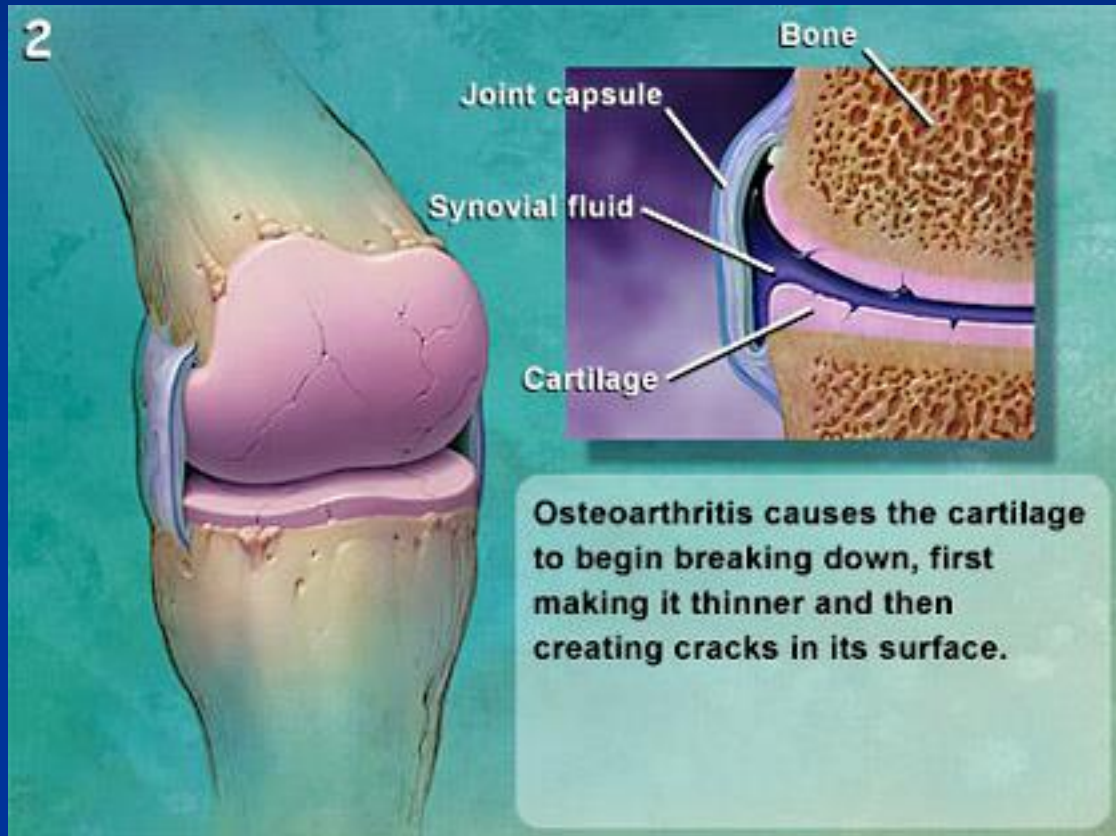
RISK FACTORS

■ REPEATED USE:

- Farmers: Hip
- Miners: Knee and Spine
- Runners: Hip
- Elite runner: Hip and Knee

PATHOLOGY

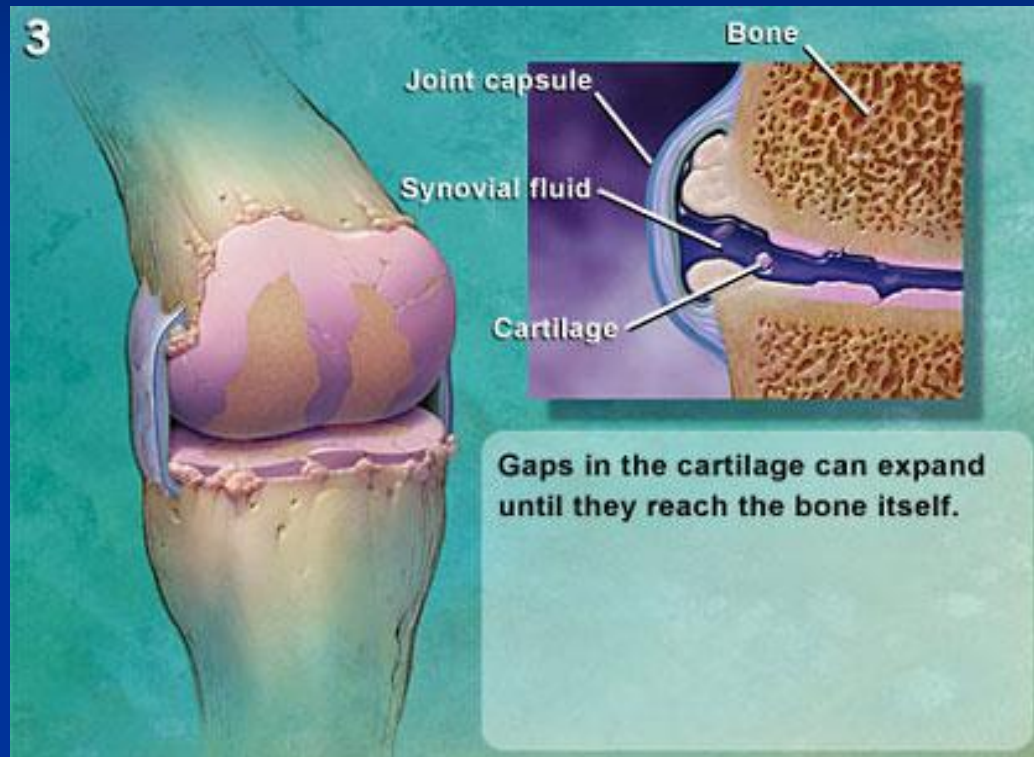
PATHOLOGY



The earliest finding: fibrillation of superficial layer of cartilage.

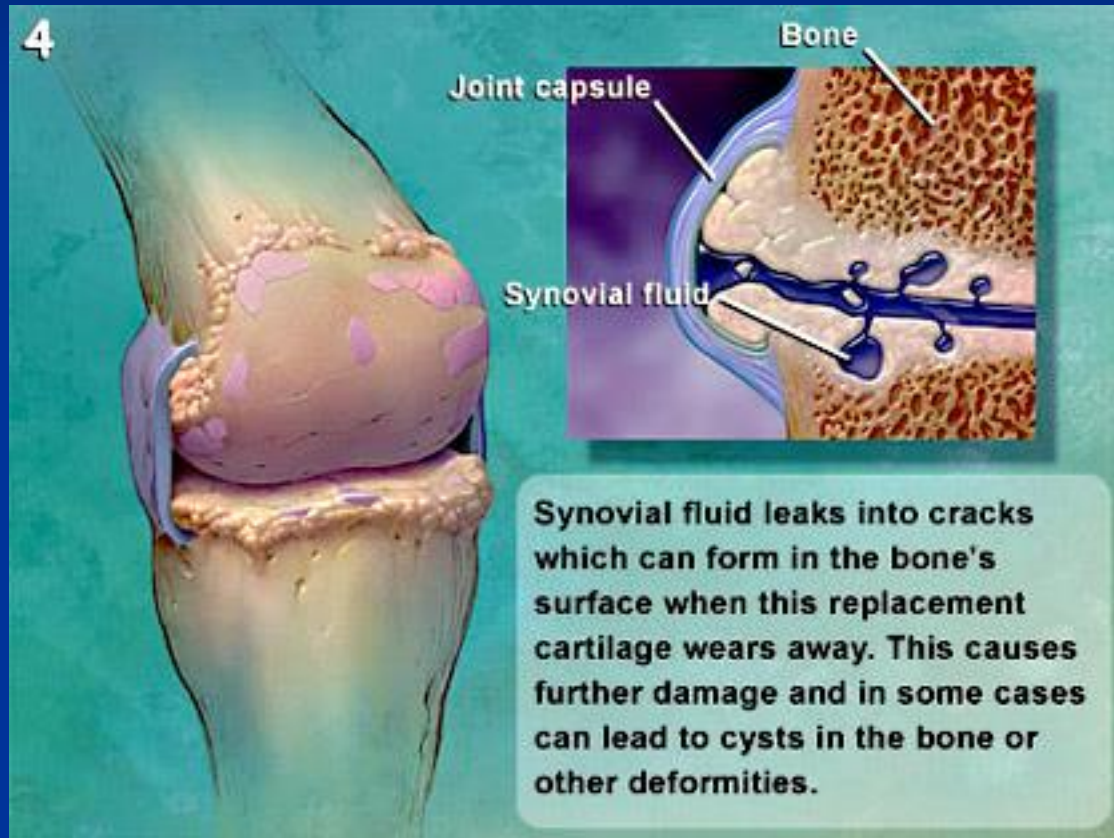
- Chondrocyte undergo mitosis and cluster
- Catabolic activity increase
- Negative charge PG get expose
- Cartilage swelling
- chondrocyte at basal layer apoptosis
- GF and cytokine stimulate OB and OC
- Bone formation and osteophyte form near area of cartilage loss

PATHOLOGY



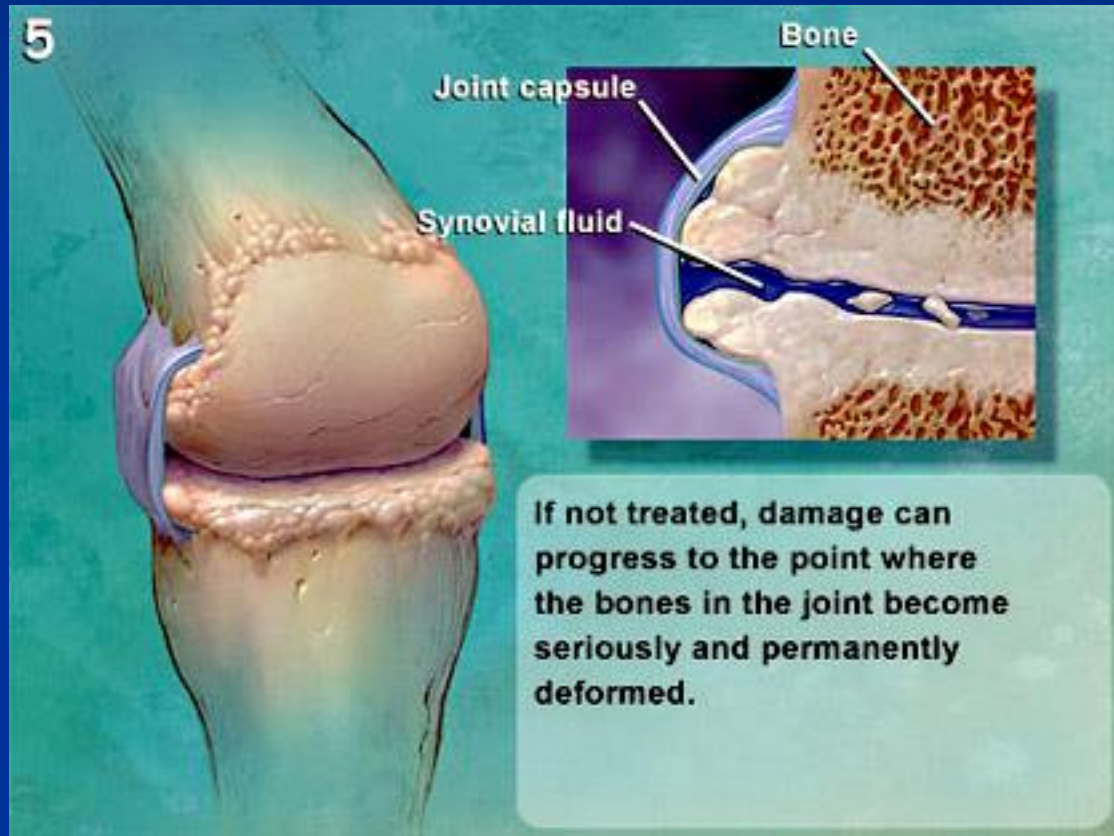
Disruption become deeper.

PATHOLOGY



Fragmentation of cartilage with release into the joint .

PATHOLOGY



Complete loss of cartilage, leaving only exposed bone.

- Synovitis and proliferation
- Capsule fibrosis
- Erosions
- End stage OA deposition CPPD

SOURCE OF PAIN

SOURCE OF PAIN

■ Cartilage → Aneural

■ Innervated structures:

● Synovium, Ligaments, Capsule, Muscle, Bone



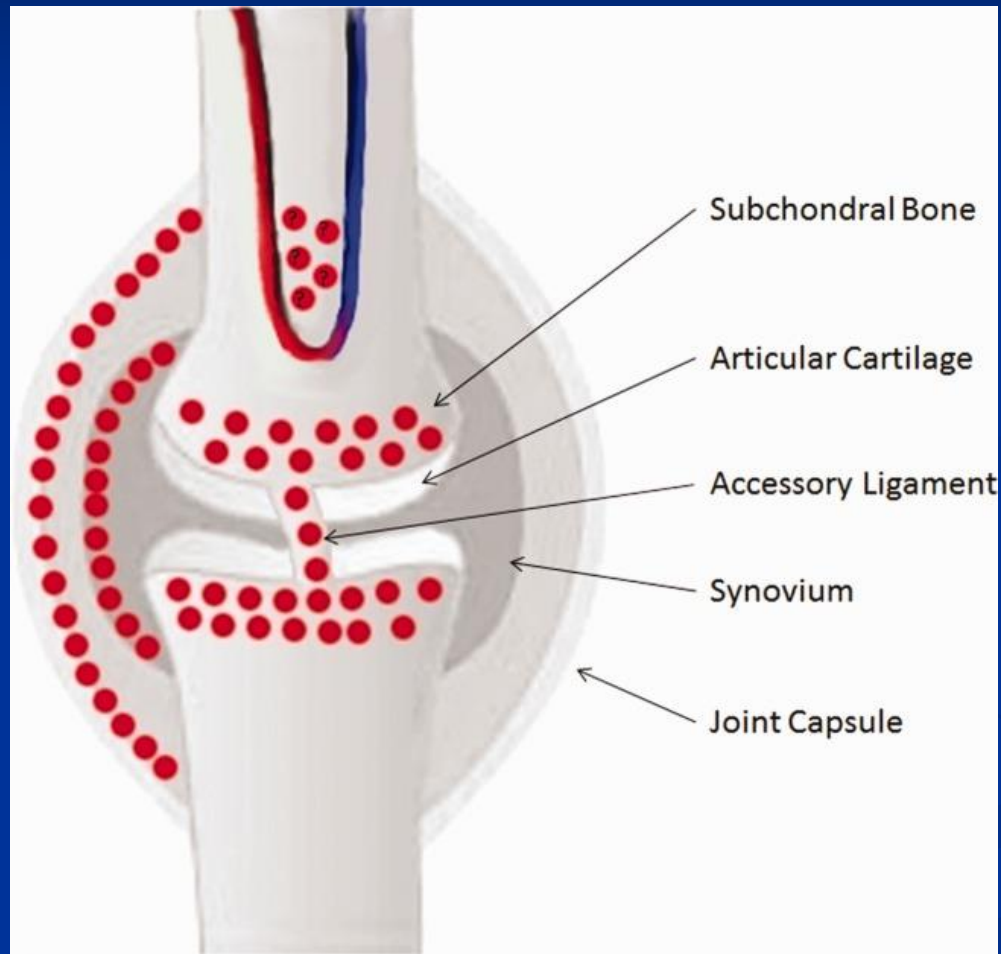
NOT VISUALIZED BY X RAY

POORLY CORRELATION



X RAY CHANGES AND PAIN SEVERITY

Pain generators



CLINICAL FEATURES

CLINICAL FEATURES

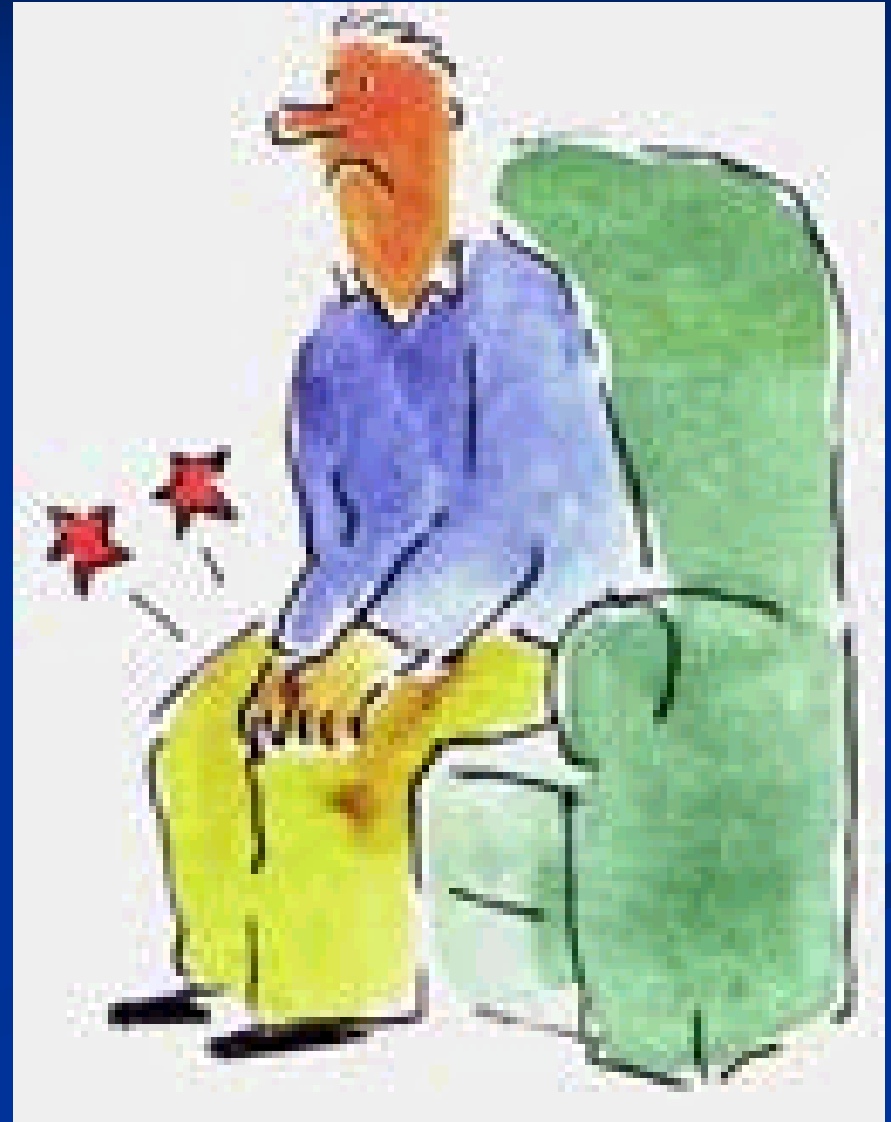
- Mechanical pain

- Factors that affecting pain report:

- Age
- Sex
- Socioeconomic status
- Race
- Cultural status

CLINICAL FEATURES

- Mechanical pain
- Gelling pain
- Night pain
- Joint effusion



CLINICAL FEATURES

■ examination:

- ✿ Tenderness
- ✿ Bony enlargement
- ✿ Crepitus with movement
- ✿ Joint effusion

CLINICAL FEATURES

■ examination:

- ✿ Limitation of joint motion
- ✿ Joint deformity
- ✿ Joint instability
- ✿ Muscle weakness and gait abnormality

CLINICAL FEATURES

■ KNEE:

- ✱ Buckling

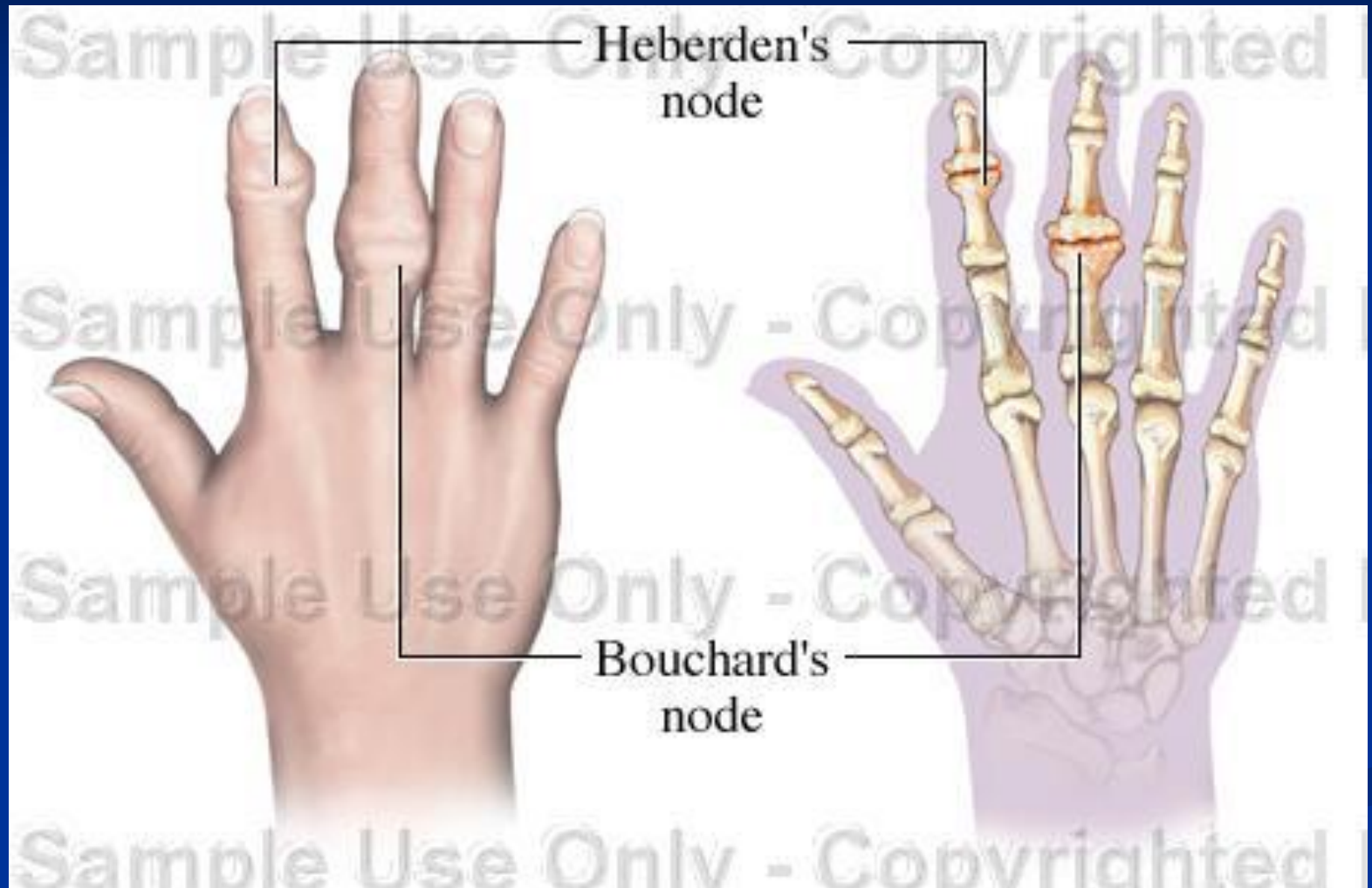
- ✱ Locking

CLINICAL FEATURES

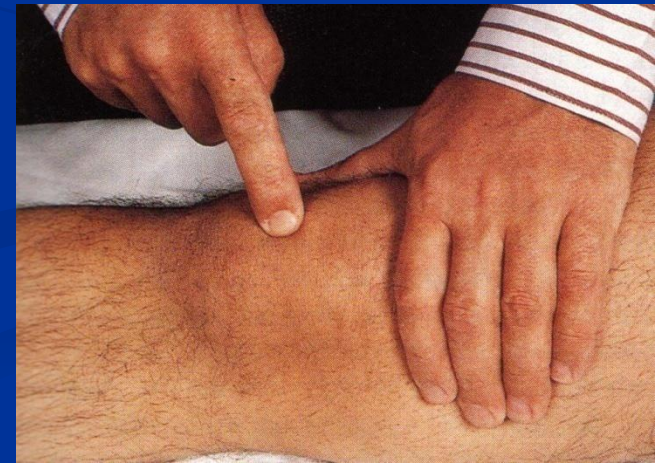
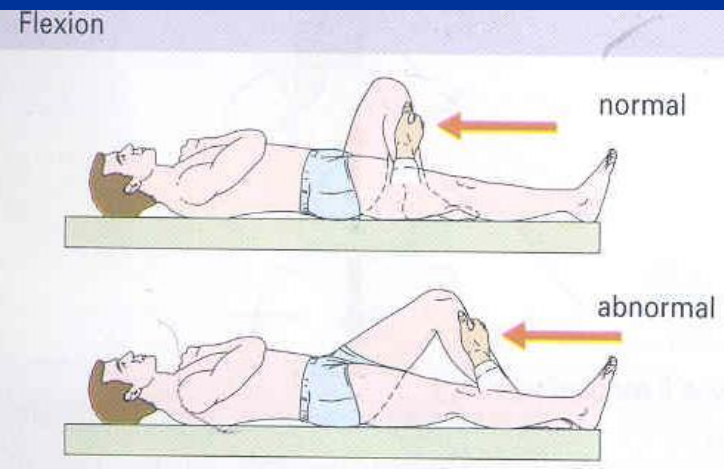
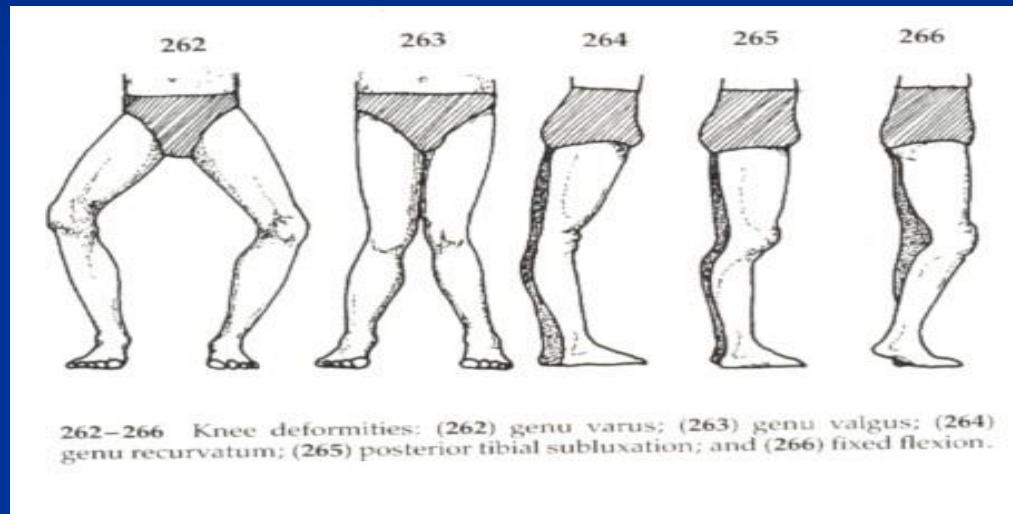
■ Hand OA:

- ✿ Most common in middle aged women
- ✿ Strong family history in first-degree relative

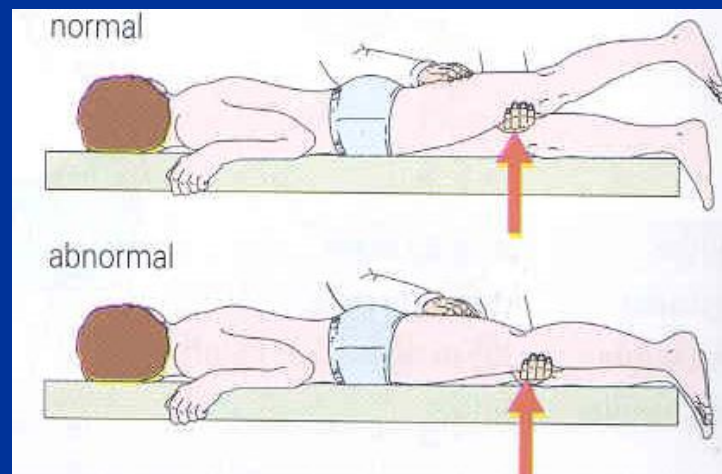
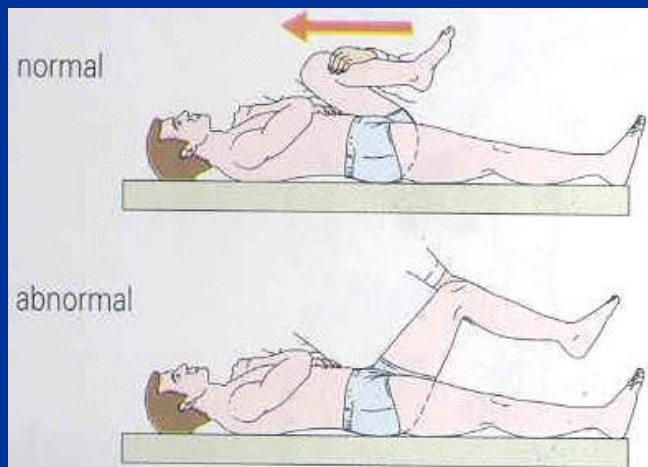




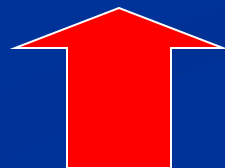
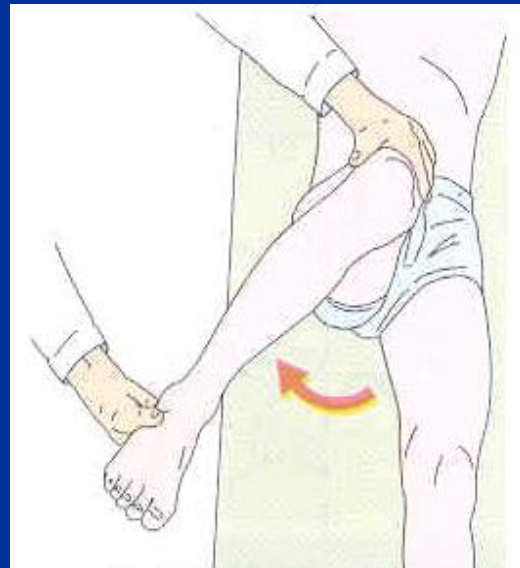
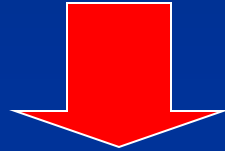
PHYSICAL EXAMINATION



PHYSICAL EXAMINATION



PHYSICAL EXAMINATION



PATRICK'S TEST (FABER TEST)



DIAGNOSIS

- CLINICAL
- No blood test routinely indicated
- Synovial fluid

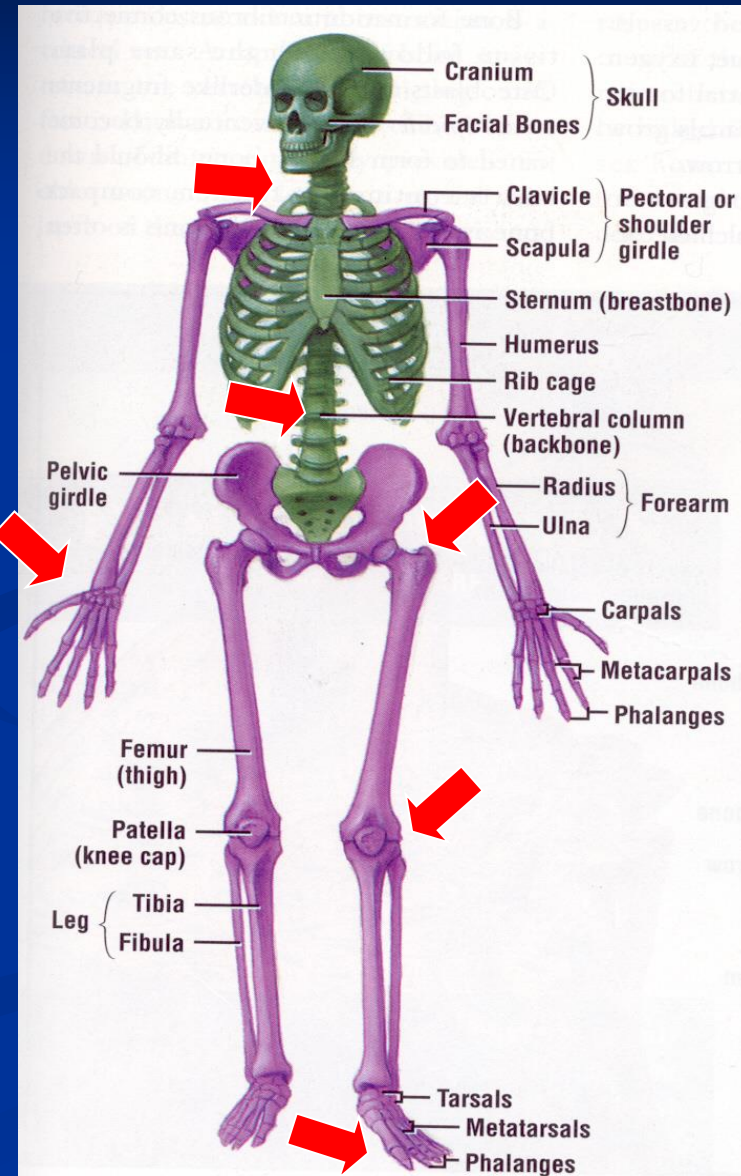
DIAGNOSIS

■ Common in:

- Knee, hand, spine...

■ Spared:

- Wrist, elbow, shoulder, ankle



DIAGNOSIS

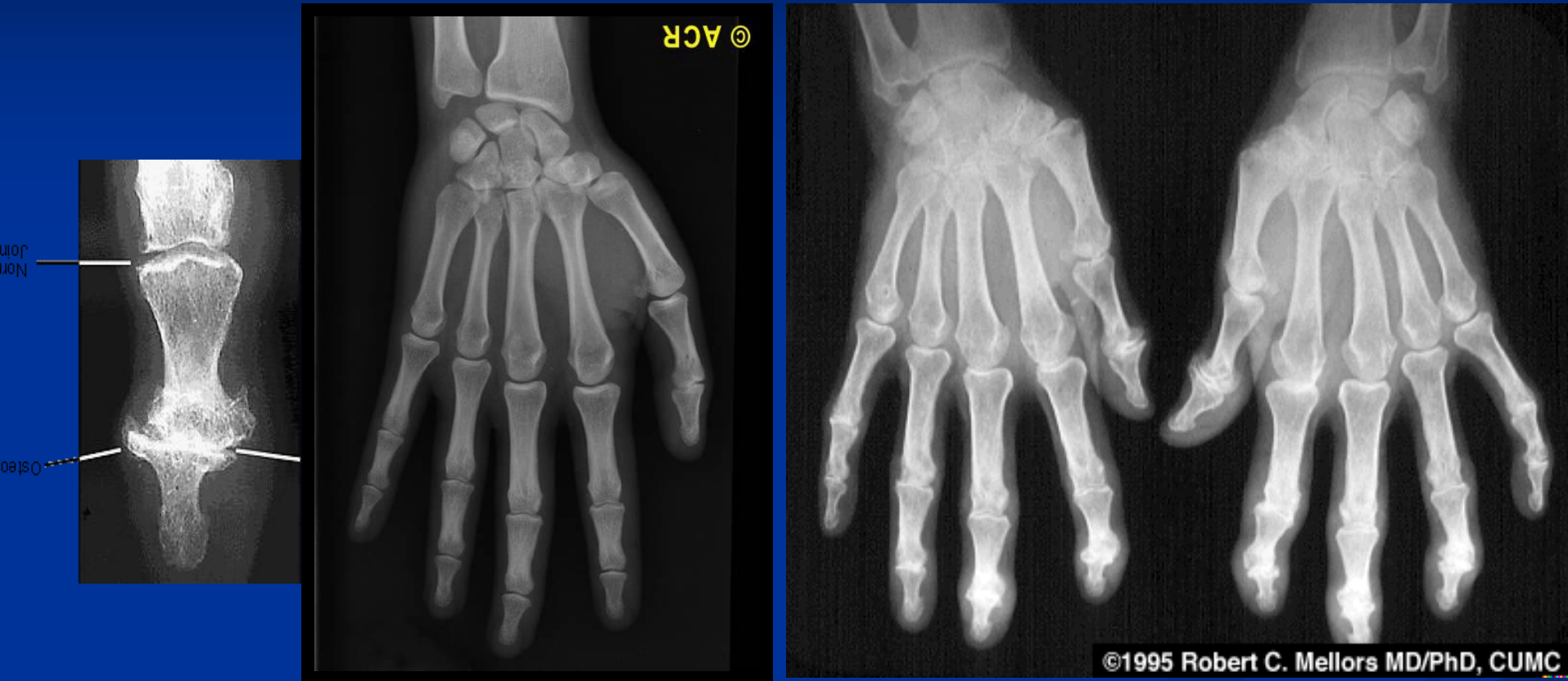
■ X Ray:

- Hand and hip pain
- knee if:
 - Not typical symptom
 - Pain persists after effective treatment
- Poorly correlation with pain severity

■ MRI: Not indicated

RADIOLOGY

HAND OA



HAND OA



HIP OA



KNEE OA



SPINE OA



HALLUS RIGIDUS



Before



After



TREATMENT

TREATMENT

- A multimodality approach
- Individualized

TREATMENT

■ NON PHARMACOTHERAPY

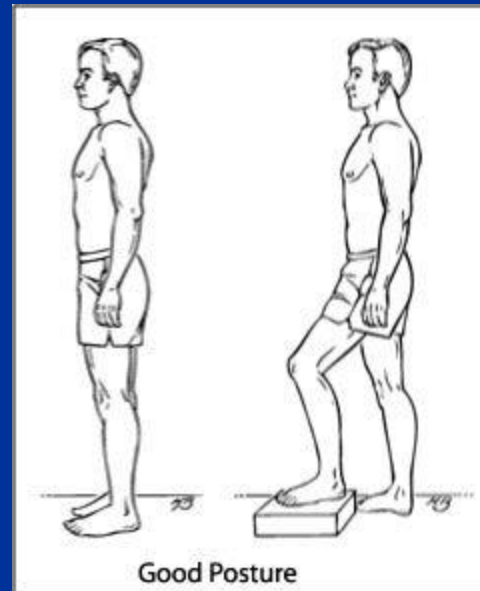
- Mainstay of therapy:
 - Altering loading across joint
 - Improving joint protectors
- Weight loss:
 - Each Kg of weight: ↑ Load in knee 3-6 fold
 - ↓ Symptom



TREATMENT

■ NON PHARMACOTHERAPY

- Avoiding overload the joint



- Knee & Hip → Cane in opposite hand

TREATMENT

■ NON PHARMACOTHERAPY

● Exercise:

- Age
- Disuse
- Arthrogenous inhibition

TREATMENT

■ NON PHARMACOTHERAPY

- Degree of weakness correlate strongly with:
 - Severity of pain and Physical limitation
- Most effective exercise:
 - Aerobic and/or resistance training
 - Individualized
 - Avoiding exercises that increase pain
 - Water aerobics training

TREATMENT

■ PHARMACOTHERAPY

- Symptomatic relief but doesn't alter course of disease

TREATMENT

■ PHARMACOTHERAPY

- Acetaminophen
- NSAID
- Injection
- Glucosamine and chondroitin

TREATMENT

- Glucocorticoid injection:
 - Efficacy is variable
- Hyaluronic acid:
 - Controversy
- Recent guideline against glucosamine & chondroitin

TREATMENT

■ Surgery:

- Arthroscopic debridement and lavage: as no treatment
- Arthroscopic meniscectomy: no effective
- Total knee or hip arthroplasty:
 - Remain in pain
 - Limitation of function
 - Compromise quality of life

Key message

- Global prevalence of osteoarthritis is increasing and the burden of the disease will rise
- Osteoarthritis will become one of the most prevalent diseases in populations from high-income countries in the coming decades
- Imaging is not needed to diagnose osteoarthritis
- Key treatments are education, exercise, and weight loss if needed

Key message

- Because of the heterogeneity of the disease and comorbidities involved, personalised treatment is essential
- • Disease-modifying treatment is not yet available
- • Pain-modifying treatment, especially which treats or prevents sensitised pain, is essential in the coming years
- • Inappropriate treatments including arthroscopy and opioids should be actively discouraged
- • Careful selection of appropriate candidates for surgical referral and joint replacement would optimise outcomes
- • Prevention of osteoarthritis is in its infancy, but lifestyle interventions seem promising

