มหาวิทยาลัยราชภัฏนครปฐม
Nakhon Pathom Rajabhat University

มหาวิทยาลัยราชภัฏนครปฐม

มหาวิทยาลัย
ราชภัฏนครปฐม

Musculoskeletal disorder

ORRUETHAI THANAKUMMA
MSN,RN
Faculty of Nursing, NPRU

Learning outcomes

- 1. Describe abnormalities related to the musculoskeletal system.
- 2. Describe the pathology, signs and symptoms of patients with musculoskeletal disorders.
- 3. Describe the principles of treatment for bone fractures and musculoskeletal diseases.
- 4. Correctly explain nursing diagnosis and nursing in the musculoskeletal system.

Musculoskeletal disorder : overview

- soft tissue injuries
- Dislocation and Subluxation
- Carpal Tunnel Syndrome
- Fracture
- Amputation

Joint and connective tissue diseases

- Rheumatoid arthritis
- Gouty Arthritis
- Osteoarthritis septic arthritis
- Osteoporosis
- Osteomyelitis

Arthritis

- Inflammation of joints & breakdown of cartilage, which normally protects the joint
- Women affected twice than men
- Acute forms

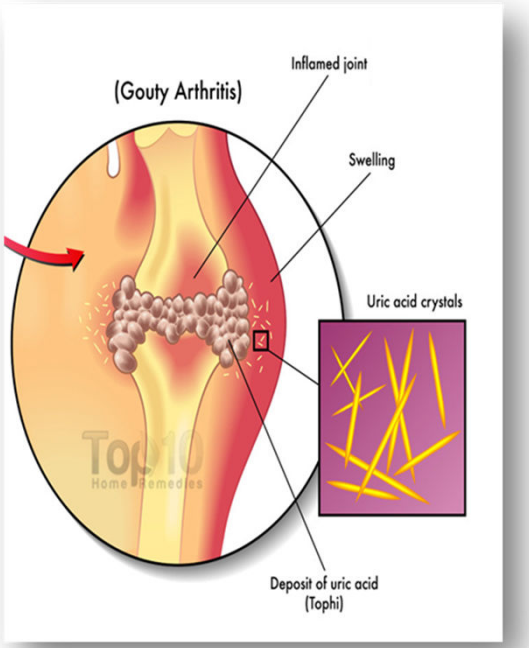
- caused by bacteria & treated with antibiotics (septic arthritis).

- Chronic forms (osteoarthritis, rheumatoid arthritis, and gouty arthritis)

(Osteomyelitis)

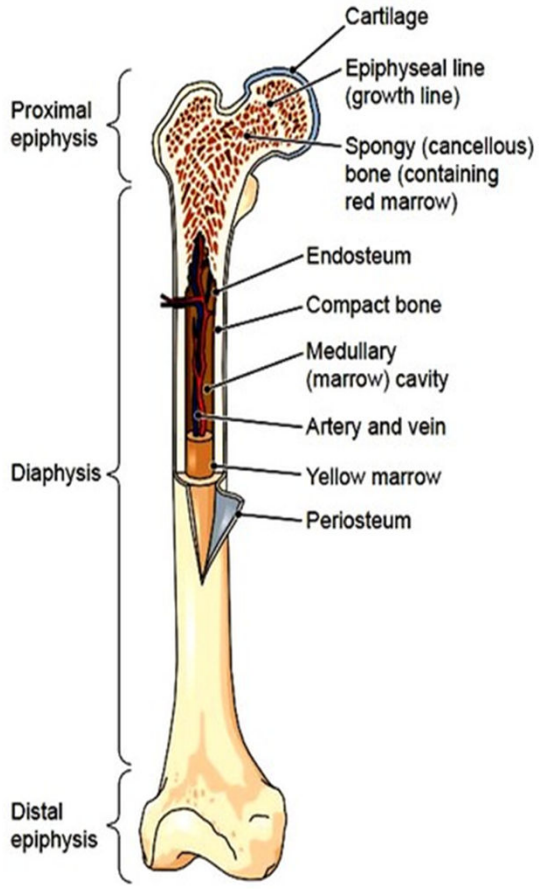
(Rheumatoid arthritis)

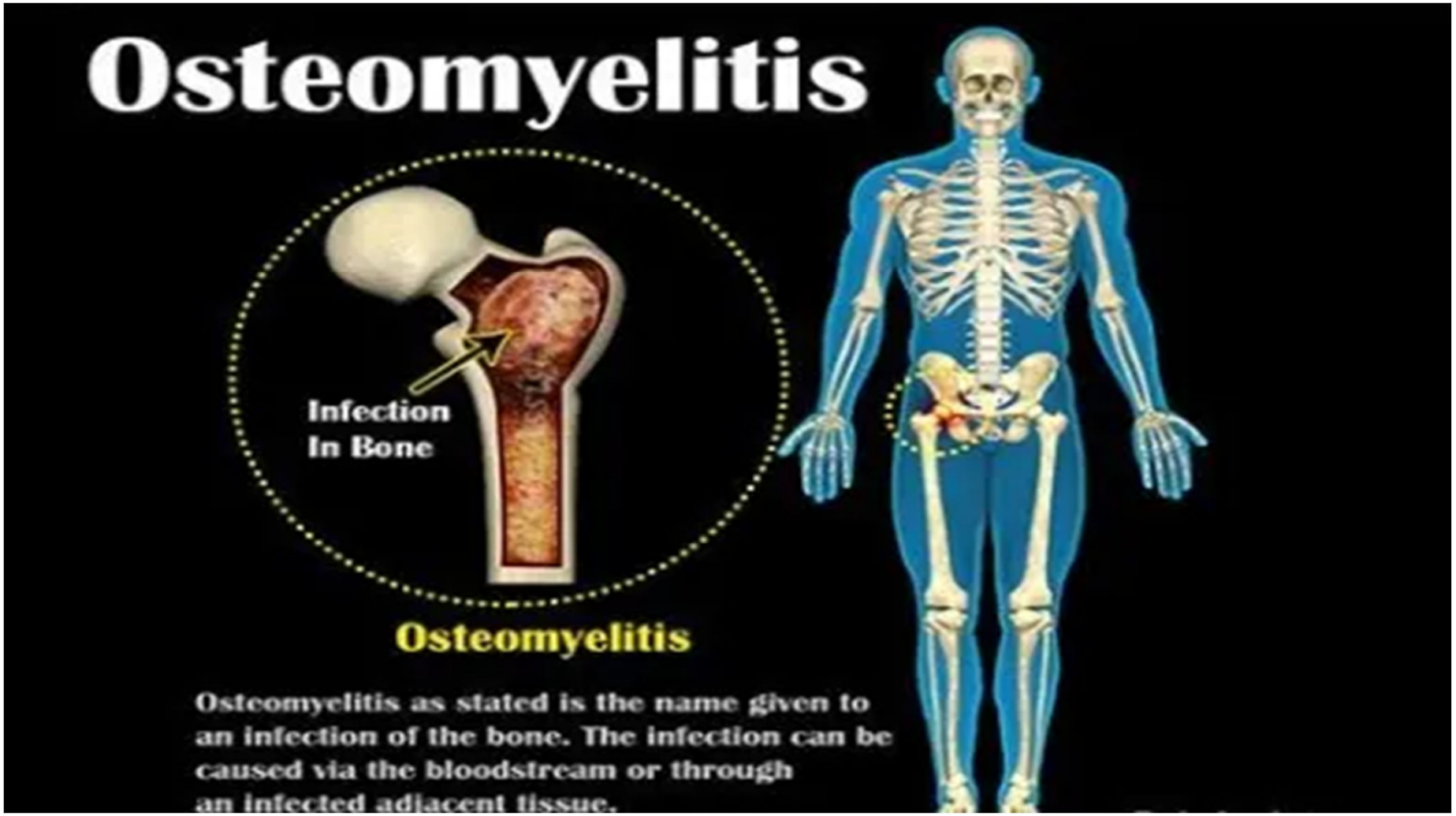
(Gouty arthritis)



Osteoarthritis

- Degenerative synovial joint disease(DJD)
- characterized by cartilage loss with an accompanying periarticular bone response No simple definition because of consideration of three overlapping areas
- Pathologically- alteration in cartilage structure,
- Radiologically - osteophytes and joint space narrowing
- Clinically - complain of pain and disability.



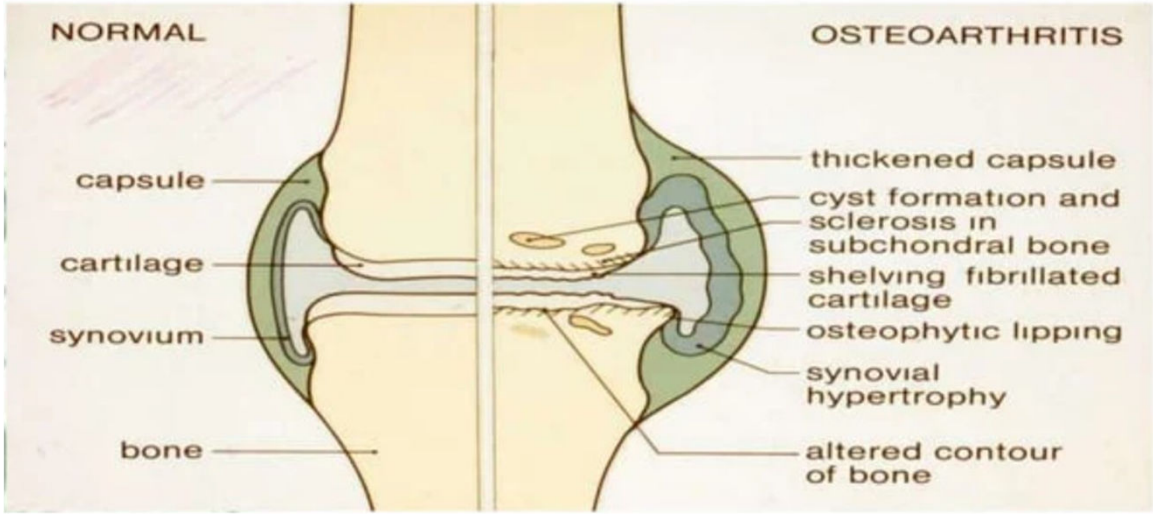

Osteomyelitis
Infection
In Bone
Osteomyelitis
Osteomyelitis as stated is the name given to an infection of the bone. The infection can be caused via the bloodstream or through an infected adjacent tissue.

Osteoarthritis (cont'd)

- Most common & frequent disabling joint disease and prevalence increases with age
- Probably related to normal aging process
- "Wear and tear" arthritis; affects the
- articular cartilages, causing them to soften,
- fray, crack, and erode
- It is non inflammatory- only cartilage is
- affected, not synovial membrane

Osteoarthritis (cont'd)

- Deterioration of cartilage produces bone spurs → Restricts movement
- Pain up on awakening-→ disappears with movement



Osteoarthritis (cont'd)

- Causes and types
- Osteoarthritis can be primary or secondary
- 1. Primary /Idiopathic/ OA:-
- The cause is Unknown
- Genetic factors and allergy is the most common predisposing factors
- It is not inflammatory joint disease

Osteoarthritis (cont'd)

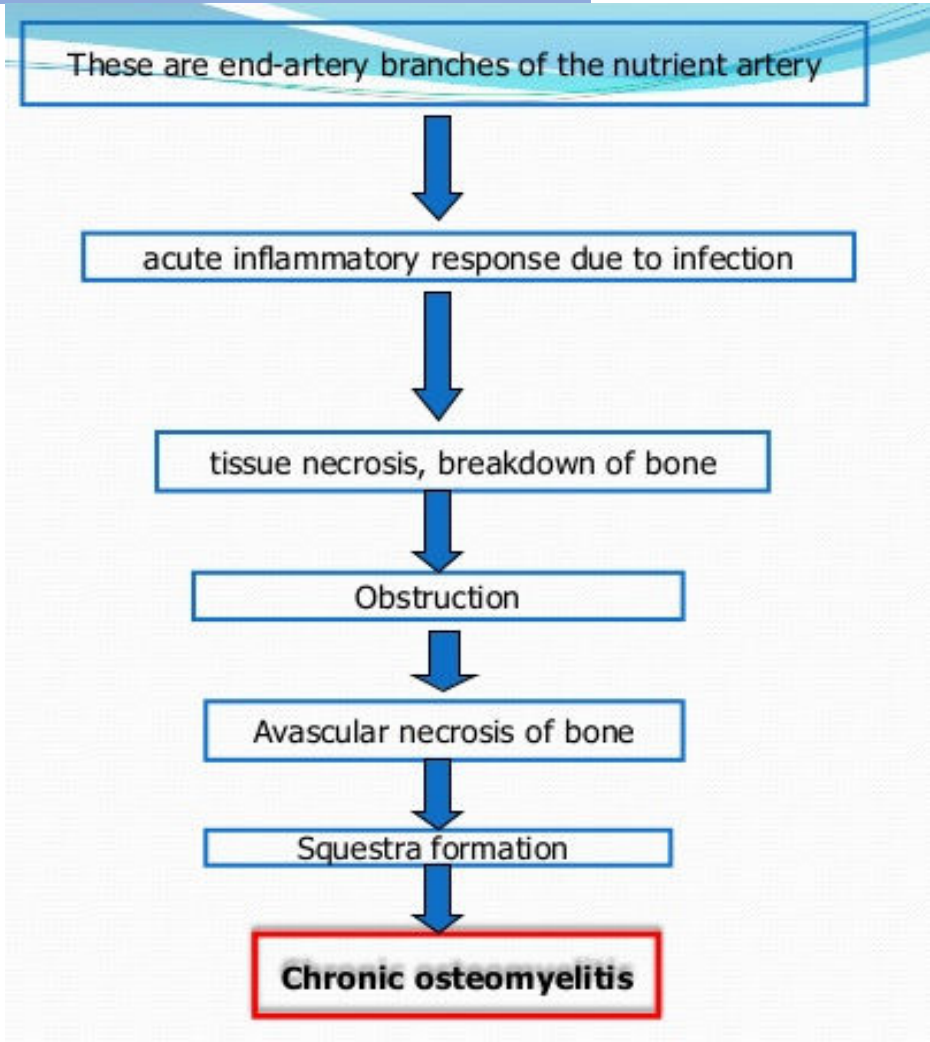
- Causes and types (cont'd...)
- 2. Secondary OA
- • Caused by other conditions:
- - Previous joint infection e.g. RA ,Gout, SA
- - Inflammation
- - Trauma , surgery
- - Certain occupation or activities
- - Endocrine is order (acromegally or hyperparathyroidism
- - Skeletal deformity
- - Hemophilia

Osteoarthritis Causes and types (cont'd...

- Other Predisposing factors to OA:
- ▪ Age
- Weight- Obesity
- genetic indisposition
- Sex - women; a higher after the menopause
- suggests a role for sex hormones.
- Hypermobility- Increased range of joint motion and reduced stability

Pathophysiology of osteoarthritis

- Damage of articular cartilage
- Surface of cartilage becomes rough and wear
- Enzymes released - accelerate disintegration of cartilage
- Subchondral bone may be exposed
- Cysts/ oseophytes -new bone spurs developed
- Osteophytes and cartilages break of
- Joint space narrowed
- Secondary inflammation of surrounding tissues
- Loss of normal joint ROM
- Pain with weight bearing and use



Clinical manifestations OA

WHAT ARE THE SYMPTOMS OF OSTEOMYELITIS?

- FEVER
- FATIGUE
- NAUSEA
- LIMITED MOTION RANGE
- IRRITABILITY OR LETHARGY IN CHILDREN
- REDNESS IN THE INFECTED AREA
- SWELLING AROUND THE AFFECTED BONE
- PAIN IN THE INFECTED AREA
- TENDERNESS AND A SENSATION OF WARMTH AROUND THE INFECTED AREA

Marina Del Rey Hospital
A CEDARS-SINAI AFFILIATE

Clinical manifestations OA

Signs and Symptoms of chronic osteomyelitis

- Pain
- Pyrexia
- Redness
- Tenderness
- Draining sinus
- Excoriation of skin

Diagnosis of osteoarthritis

- History
- Physical examination
- Investigations:
- ・Blood tests.
- No specific test
- ・ESR and CRP are normal.
- ・Rheumatoid factor and antinuclear antibodies
- are negative.
- ・X-rays - abnormal only when the damage is
- advanced.
- ・MRI - early cartilage and subchondral bone
- changes.
- ・Arthroscopy - reveals early fissuring and surface
- erosion of the cartilage.

Management
(Medical and Nursing care) of osteoarthritis

- Objective : treat the symptoms and
- disability, not the radiological appearances
- - Relief pain
- - Restoration of joint functions
- - Prevention of disability and complication

Management (Medical and Nursing care) of osteoarthritis

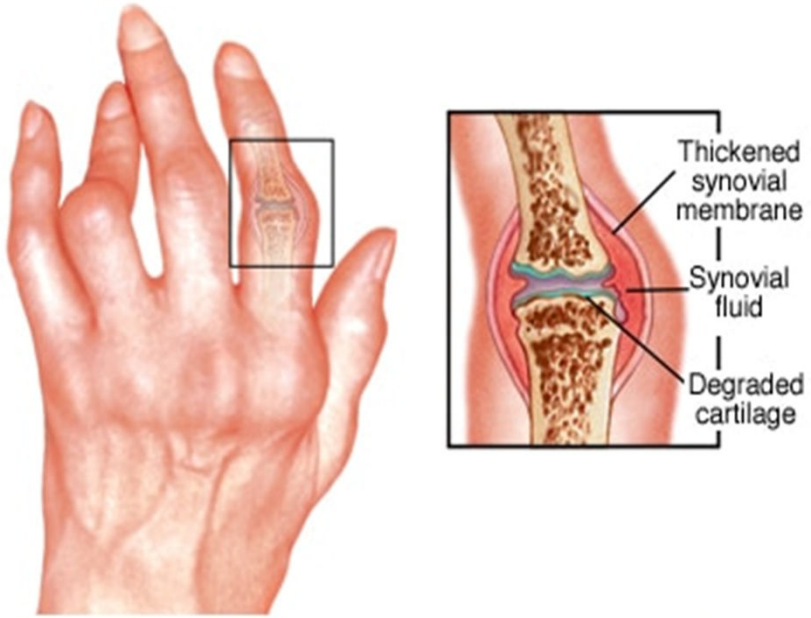
- Pharmacological Rx:
- • Acetaminophen
- • NSAID
- • Analgesics
- • Intra articular steroid injection

Management (Medical and Nursing care) ofosteoarthritis

- Non-pharmacological mgt
- ・ Weight reduction
- ・ Heat application to relief pain and relaxing muscles
- before exercise
- ・ Application of cold after exercise to decrease pain
- and swelling
- ・ Exercise and prevent injuries
- ・ Surgical management like
- VArthrodesis or joint fusion
- Joint replacement

2. Rheumatoid arthritis(RA)

- Systemic,symetrical disease
- characterised by chronic
- recurrent inflammation of joint and surrounding soft tissue .
- Has periods of remission &
- exacerbation.
- - Remission-period when disease symptoms are reduced or absent.
- - Exacerbation -a period when disease symptoms occur or increased.



Rheumatoid arthritis (cont'd...

- • Symptoms begin with bilateral inflammation of certain joints Of ten leads to deformities
- Cartilage attacked
- Inflammation, swelling & pain
- Final step is fusion in joint

Etiology of rheumatoid arthritis

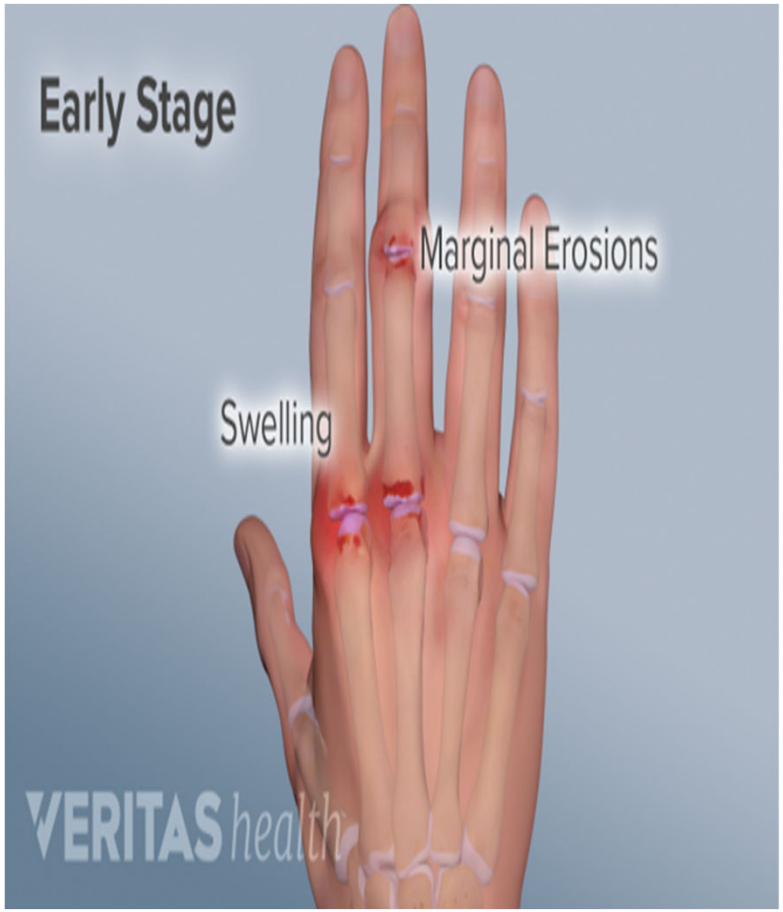
- • Cause unknown
- Suggested - response to an infectious agent in a genetically susceptible host.
- • Predisposing includes
  - Autoimmune reaction
  - Genetic predisposition
  - Infection - viral & bacterial (rubella, mycoplasma, CMV and EBV virus)
  - Other factors such as metabolic ,nutritional & environmental factors.

Rheumatoid arthritis (cont'd...

- Occurs in around 3 of women and 1% ofmen
- Caused by a cell-mediated (T-cell) autoimmune response
- Rheumatoid factor positive in 80% Often starts with symmetrical disease affecting small joints of the hands and feet

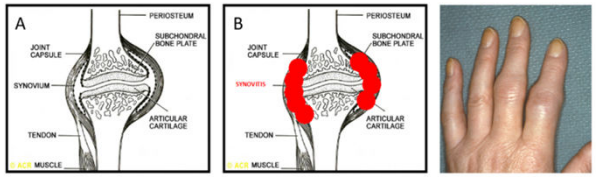
symptoms of RA

- Early symptoms include:
- • Fatigue
- • Weight loss
- • Fever
- • Malaise
- • Morning stiffness of joints
- • Pain at rest and with movement
- • Edematous, Erythemataus "baggy" joint



symptoms of RA

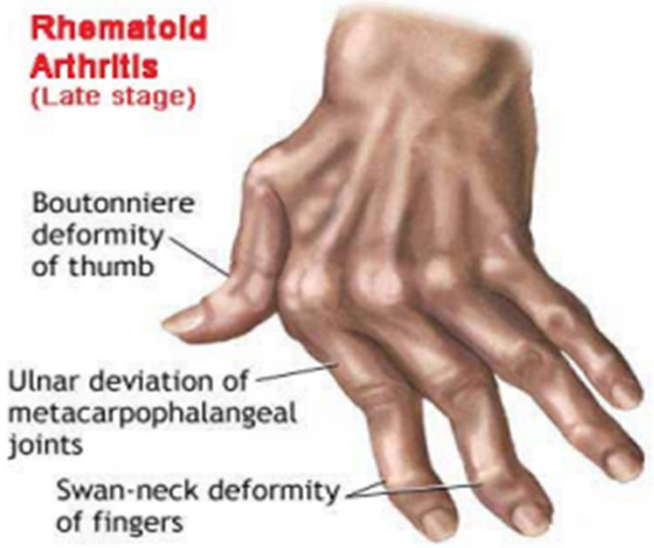
- Late symptoms include
- • Color changes of digitalis (bluish, rubor, pallor)
- • Muscle weakness, atrophy
- • Joint deformity
- • Decreased joint mobility , Contractures
- • Subluxation or complete dislocation
- • Increasing pain
- • Formation of rheumatoid nodules are aggregate of
- inflammatory cues



Rheumatoid arthritis synovitis These images show a cartoon structure of a normal joint (A), rheumatoid arthritis 'synovitis' which is inflammation of the lining of the joint (B), and what synovitis looks like in a person who has rheumatoid arthritis. *Images Copyright 2018 American College of Rheumatology*

Problems in the hand and wrist caused by RA:

- Radial deviation of the wrist
- Extensor tendon ruptures
- Ulnar deviation metacarpophalangeal joints
- Z-deformity of the thumb
- -Boutonniere deformity of the fingers
- -Swan neck deformities
- Carpal tunnel syndrome



Diagnosis of rheumatoid arthritis

- Clinical features
- Positive rheumatoid factor
- Titer increases at active diseases (antinuclear antibody)
- Lab finding
- Indicator of active inflammation
    - ESR - increased,
    - RBCS- decreased
    - C-reactive protein (CRP)
    - Abnormal synovial fluids
- X-ray study
- Biopsy

Diagnosis of rheumatoid arthritis (cont'd...)

- Diagnostic Criteria:
- • Morning stiffness > 1 hours & at least 6 weeks
- duration
- Soft tissue swelling of 3 or more joints for at least 6
- weeks (wks)
- Swelling of wrist, metacarpophalangeal or proximal
- interphalangeal joints at least 6wks

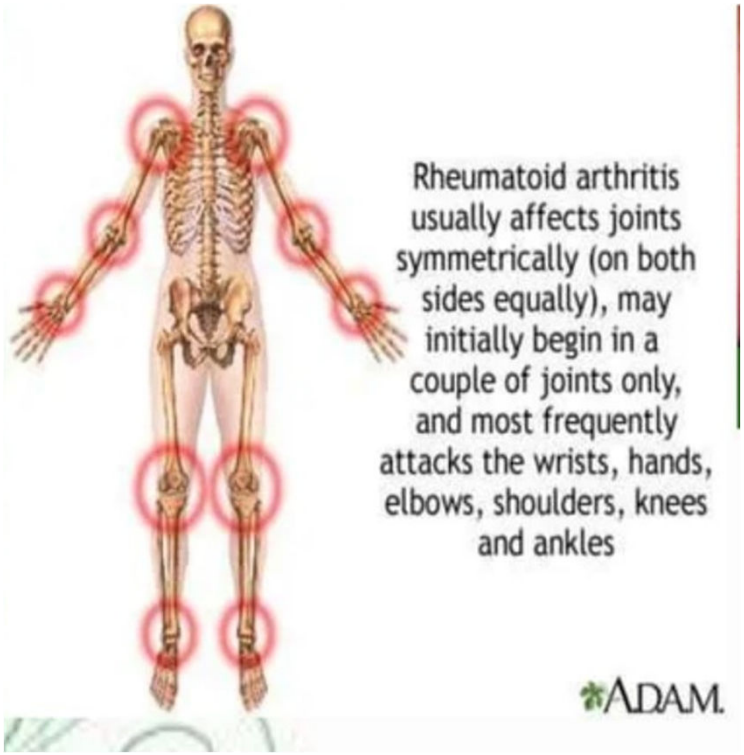
Diagnosis of rheumatoid arthritis (cont'd...)

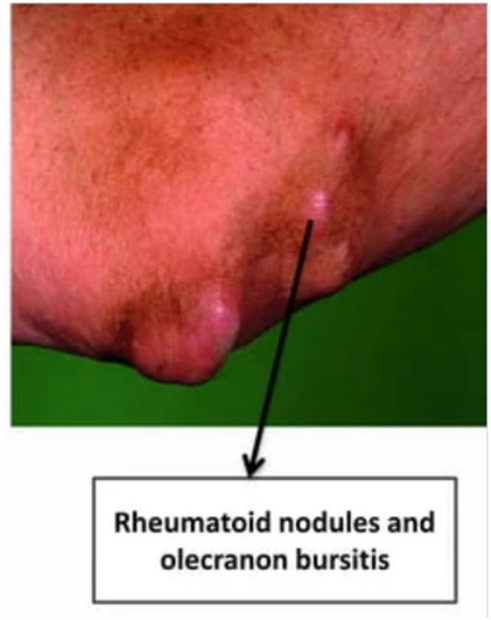
- Criteria for diagnosis of rheumatoid arthritis (American College of Rheumatology revision)

- Number: four of the seven criterias are necessary to diagnosis rheumatoid arthritis

Morning stiffness > 1 hour	**For ≥6 weeks**
Arthritis of three or more joints	
Arthritis of hand joints and wrists ,metacarpophalangeal or proximal interphalangeal	
Symmetrical arthritis	
Subcutaneous nodules	
A positive serum rheumatoid factor	
Typical radiological changes (erosions and/or periarticular osteopenia)	

Diagnosis of rheumatoid arthritis (cont'd...)





Management of rheumatoid arthritis

- Pharmacological Rx:
- 1) First line : NSAIDs
- Control symptoms & signs of local inflammatory
- process.
- Rapid alleviation pain and symptoms ,
- Minimal long term effect
- Aspirin 900 mg PO TID, Ibuprofen 400 mg PO BID or
- TID Diclofenac 50 mg PO BID , indometacin 50 mg PO
- BID.

Pharmacological Rx RA (cont'd...)

- 2) Second line :
- Low dose potent anti-inflammatory oral
- corticosteroids
- ・Systemic administration in sever
- progressive articular diseases and extra
- articular involvement
- Start with 5-10 mg/ day in the morning
- and taper the dose with improvement

Pharmacological Rx RA (cont'd...)

- 3) Third line: Disease modifying antirheumatic drugs- (DMARD)

- Methotrexate, gold compounds, d-penicillamine,
- antimalarials and sulfasalazine
- Have the capacity to alter the course of RA.
- Used in NSAIDS non -respondent
- Methotrexate is the most frequently used &
- relatively rapidly acting (given in an intermittent
- low dose: 7.5-30 mg once weekly)

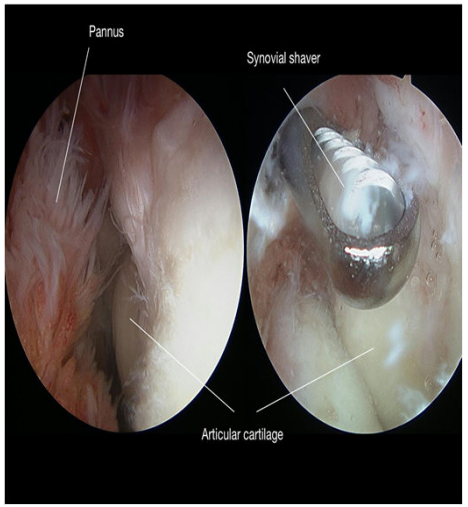
Pharmacological Rx RA (cont'd...)

- 4) Fourth line: Anti cytokine agents:
- Biological agents that bind & neutralize TNF.
- effective in controlling signs & symptoms failed to
- respond with DMARDs.
- 5) Fifth line : immunosuppressive therapy :
- Include azathioprine, cyclsosporine, and
- cyclophosphamide.
- Same therapeutic effect as DMARDs 10A

Non Pharmacological Rx RA

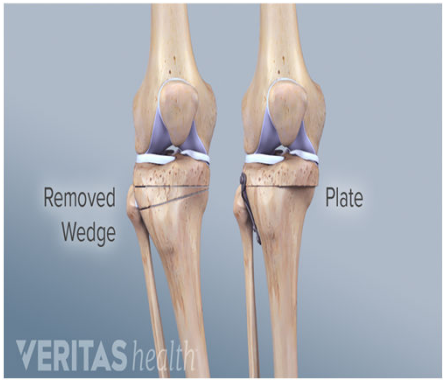
- Nursing management
- Health teaching about balance of rest and exercise, drug side effects
- Give the prescribed drugs
- Encourage physiotherapy & occupational therapy
- Physiotherapy
- Surgical mgt (Arthroplasty, synovectomy, t
- transplants)

Synovectomy

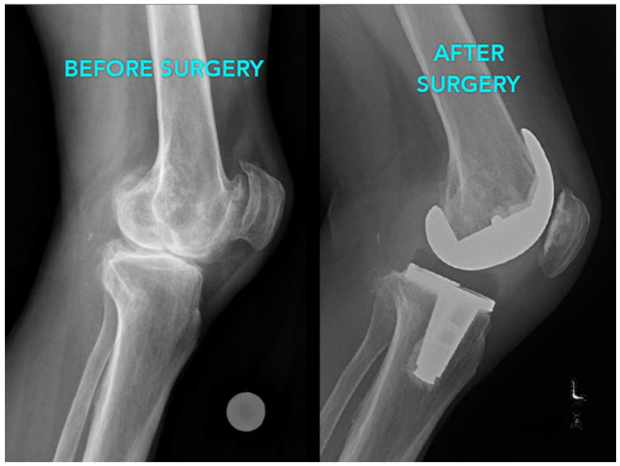


Repair soft tissue

Osteotomy



Arthroplasty



Complication of rheumatoid arthritis

- Complications of rheumatoid arthritis
  - Ruptured tendons
  - Ruptured joints
  - Joint infection
  - Spinal cord compression (atlantoaxial or upper cervical spine)
  - Amyloidosis (rare)
  - Side-effects of therapy

3. Gouty arthritis/Gout

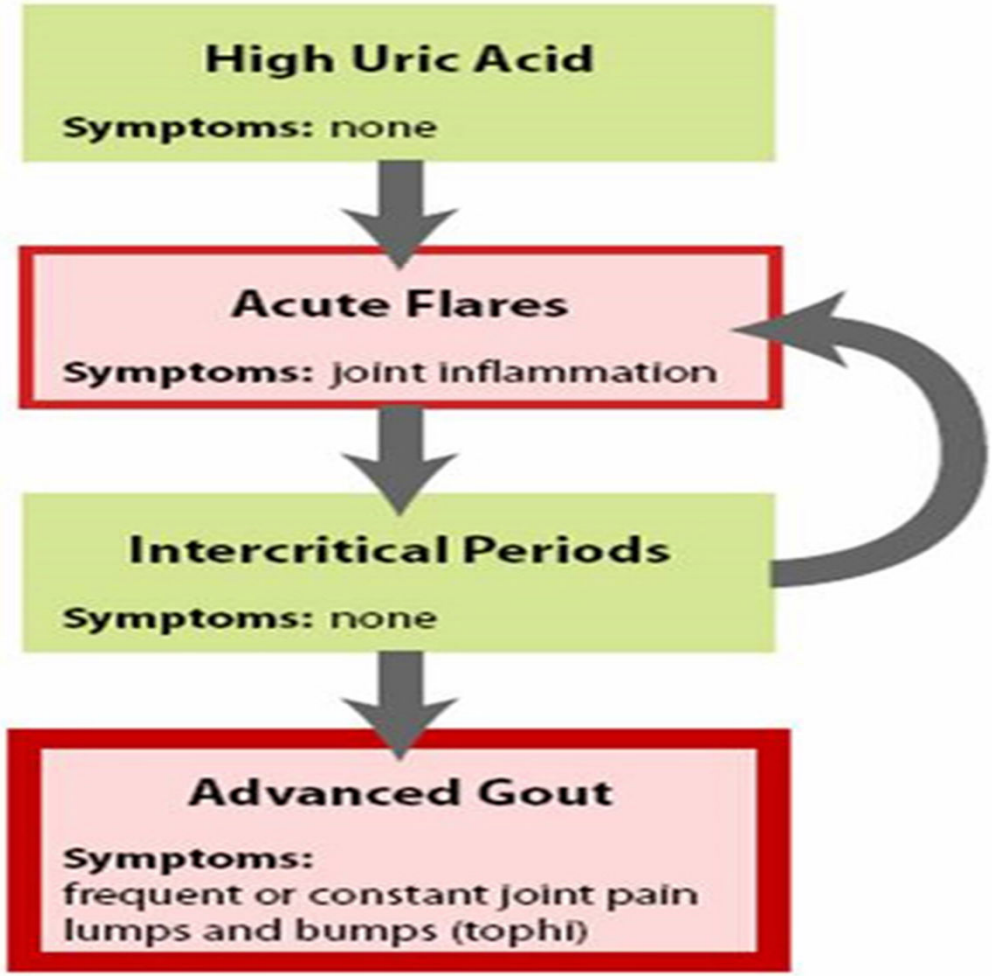
Gout is a clinical syndrome resulting from the deposition of urate crystals in the synovial fluid, joint or articular cartilage

Gout syndromes - serum uric acid concentration above 7 mg/dl.

Results from prolong hyperuricemia (elevated serum uric acid) caused by

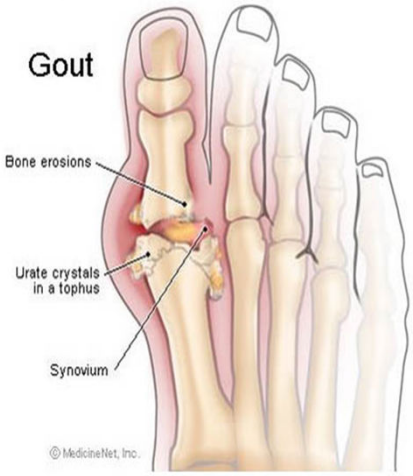
- Higher synthesis of purines or
- Poor renal excretion of uric acid

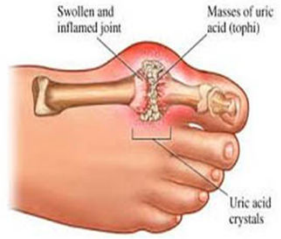
Gout Stages


High Uric Acid
Symptoms: none
Acute Flares
Symptoms: joint inflammation
Intercritical Periods
Symptoms: none
Advanced Gout
Symptoms:
frequent or constant joint pain
lumps and bumps (tophi)

symptoms of Gouty arthritis

- It Primary affects adult men & postmenopausal women
- Uric crystals build up in joints-pain
  - Waste products of DNA & RNA metabolism
  - Builds up in blood
- Deposited in cartilage causing inflame
- swelling
- Bones fuse
- Middle-aged men with abnormal gene
- Can usually be controlled with diet





Diagnostic work up of gout

- A) Acute gouty arthritis ;
- Serum uric acid value - nonspecific

(normal in 10% & often is not helpful). used to assess the effectiveness of hypouricemic therapy.

- special urate crystals WBC of 10,000-60,000
- /ul (predominant neutrophils) in Synovial
- fluid analysis:

Diagnostic work up of gout

- B chronic tophaceous gout:
- • Physical appearance of tophi
- "Firm movable and superficial located.
- • Chalky material if ulcerate and extrudes.
- • Radiologic findings:
  - Tophaceous deposits appear
  - • Punched out erosions of the subchondral bone.
  - • In first metatarso phalangal joint (MTP)

Management of gout

- Asymptomatic hyperuricemia:
- "No need for treatment
- "Correction of the underlying causes.
- Acute gouty arthritis :
- "Drug treatment is most effective if started early
- a) Colchicine
- Given early, it is effective in 85 % of patients.
- 0.6 mg is given every hr until the relief of
- symptoms or GIT toxicity occurs.

Management of acute gouty (cont'd...)

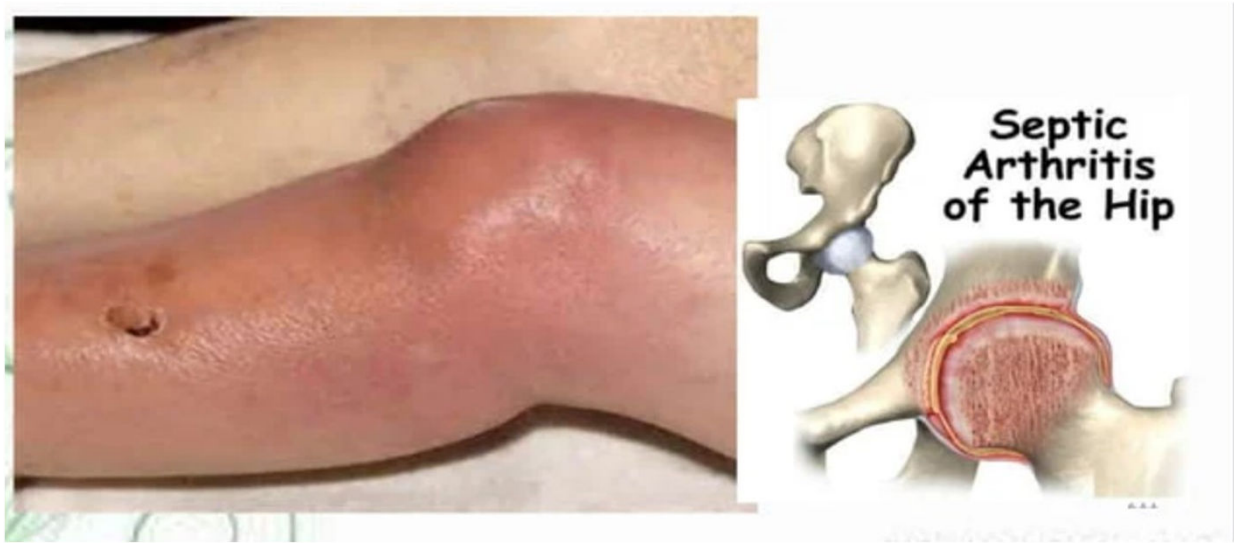
- b) NSAID:
- VUsed in high but quickly tapered dose.
- Drugs that affect uric acid clearance should be
- avoided like aspirin
- ・Indomethacine: 25-50 mg PO TID, ibuprofen:
- 800 mg po TID, Diclofenac: 25-50 mg PO TID
- c) Corticosteroids:
- Prednisolone, 30-50 mg/day as the initial dose &
- tapered over 5-7 days.

Nursing management

- Monitor drug side effects
- Avoid the predisposing factors
- Advise the patient to avoid alcohol intake
- Rest and immobilization until the acute attack subside
- Avoid heat application since of increase the inflammation
- Encourage life style modification

4. Septic(infectious) arthritis

- • Septic arthritis is inflammation of the joint that
- resulted of invasion of the synovial membrane by
- microorganisms.



Causes of septic arthritis

- Neisseria gonorrheal
- Meningococcal
- Streptococci ----->Staphylococcus aureus
- Salmonella
- Haemophilus influenza

Risk factors for septic arthritis

- Advanced age
    - Immunodeficiency
    - Chronic diseases e.g., diabetes
    - Rheumatoid arthritis
    - Preexisting joint disease or joint replacement
    - Intravenous drug abuse (corticosteroid or immunosuppressive drugs
    - Local joint surgery or trauma
    - Intraarticular injection

Pathophysiology septic arthritis

- Bacterial invasion of synovial space
- inflammation of the synovial tissue
- Accumulation pus in the synovial membrane

and synovial fluid Abscess accumulation in the synovium andsubchondral bone

- Destroying of the cartilage and ankylosis of

joints.

Symptoms of septic arthritis

- Pain, swelling and tenderness of the joint
- Pus in the synovial membrane
- Abscess in the synovium and subchondral bone
- Ankylosis of joints,
- Loss of the normal joint motion, erythema

Diagnosis of septic arthritis

- Joint aspiration/synovial fluid analysis
- WBC count
- X-ray
- Culture
- CT scan & MRI may reveal damage to the Joint lining
- Radioisotope scanning may be useful in localizing the infectious process.

Management septic arthritis

- Antibiotics e.g. cloxacillin
- Pain control
- Immobilization
- Aspiration & drainage when indicated (atrthrocentesis)
- When infection subside and motion is tolerated initiate active ROM

Bone disorders

Bone disorders....

- Bone is a specialized connective tissue,
- serving three major functions:
    - Mechanical- providing structure and muscular attachment for movement
    - Metabolic - as a reserve of calcium andphosphate
    - Protective - enclosing bone marrow and vital organs

Bone disorders....

- Bone disorders includes :
  - Metabolic bone disorders
  - Osteoporosis
  - Osteomalacia
- Infectious bone disorders
  - Osteomyelitis

Metabolic bone disorders

- Osteoporosis
- Most prevalent bone disease in the world.
- It is a disease characterized by:
- " Reduced bone quantity and quality
    - Low bone mass & density
    - Micro architectural deterioration of bone tissue
    - Leading to:
        - Enhanced bone fragility
        - Increase in fracture risk

Osteoporosis (cont'd...)

- WHO defines osteoporosis as a condition in
- which a BMD is less than -2.5 standard deviations (SD) below peak bone mass
- The consequence of osteoporosis is bone fracture.

OSTEOPOROSIS RISK FACTORS

ACCESS
- Alcohol Use
- Corticosteroid Use
- Calcium Low
- Estrogen Low
- Smoking
- Sedentary Lifestyle

"Access" (leads to) Osteoporosis

Pathophysiology of osteoporosis

- Osteoporosis is characterized by
    - Reduced bone mass,
    - Deterioration of bone matrix, and
    - Diminished bone architectural strength.
- Normal homeostatic bone turnover is altered;
    - Rate of bone resorption > rate of bone formation
    - Resulting in a reduced total bone mass

Diagnosis of osteoporosis

- Physical Examination
  - Height loss
  - Body weight
  - Kyphosis
  - Tooth loss
  - Skin fold thickness
  - Arm span-height difference
  - Wall- occiput distance
  - Rib-pelvis distance

Medical Management of osteoporosis

- Diet (rich in calcium & vitamin D)
  - Throughout life,
  - During adolescence, young adulthood, & the middle years, protects against skeletal demineralization.
    - Regular weight-bearing exercise promotes
    - bone formation.

Medical Management of osteoporosis

- Pharmacologic
  - Calcium and vitamin D
  - Hormone replacement therapy
  - Selective estrogen receptor modulators
  - Bisphosphonates
    - -Calcitonin
    - Parathyroid hormone

Infectious bone disorder

- Bone infections are more difficult to eradicate than soft tissue infections because :
  - Infected bone is mostly avascular & not accessible to the body's natural immune response.
- " There is decreased penetration by antibiotic

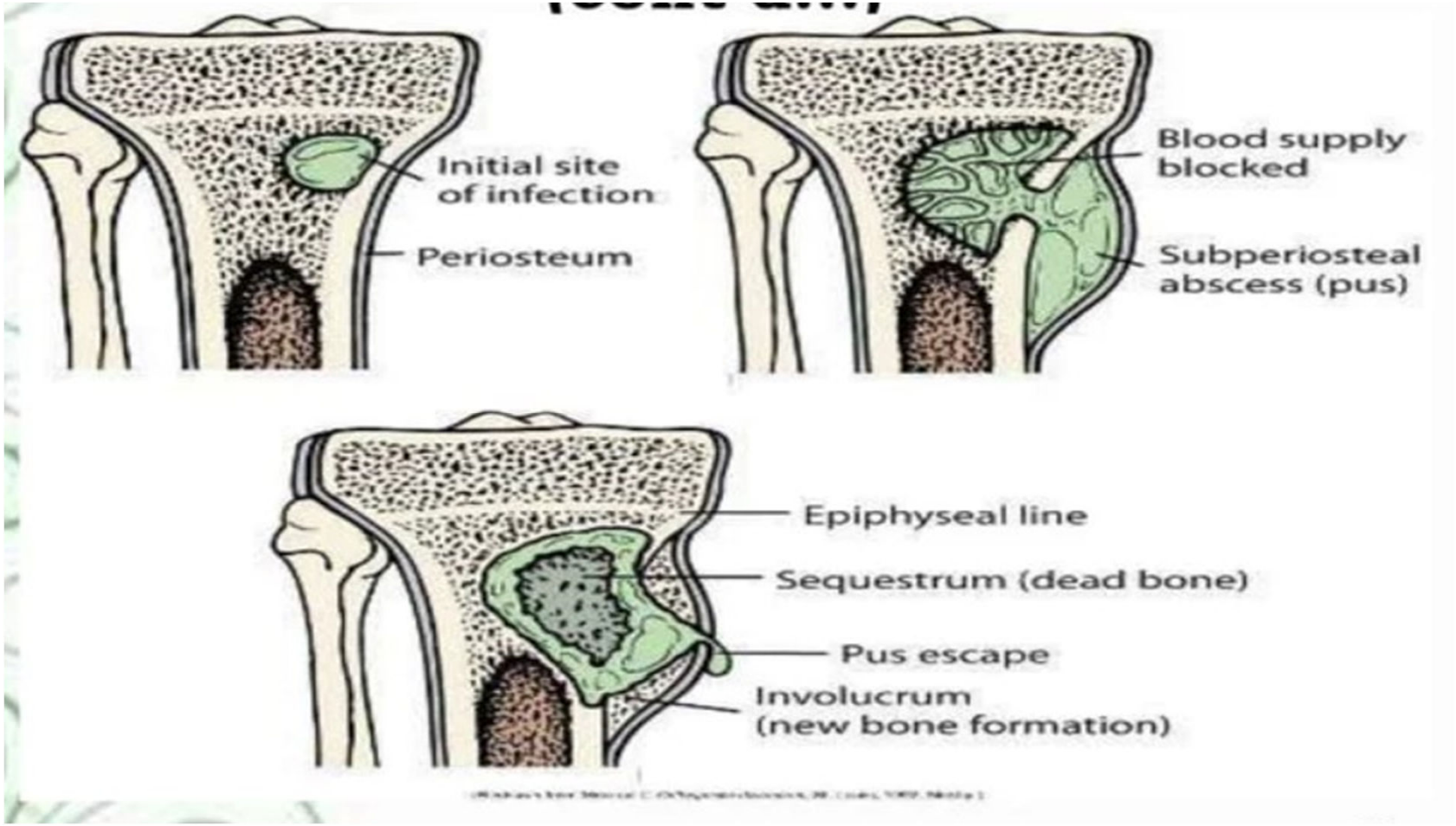
Infectious bone disorder (cont'd...

- Osteomyelitis
- Is an infection of the bone that results in inflammation, necrosis, and formation of new bone.

Osteomyelitis (Cont'd...)

- Patients at high risk for osteomyelitis:
  - Poorly nourished, elderly, or obese.
  - Impaired immune systems,
  - Chronic illnesses (e.g., Diabetes, rheumatoid arthritis),
  - Receiving long-term corticosteroid therapy or other immunosuppressive agents.

Pathophysiology of osteomyelitis



Clinical manifestations of osteomyelitis

- When the infection is blood borne, the onset is usually sudden,

  - Chills, high fever, rapid pulse, general malaise.

  - The infected area becomes painful, swollen, & extremely tender.

  - constant, pulsating pain that intensifies with movement (i.e., due to pus).

Diagnostic findings of osteomyelitis

- X-ray
  - Demonstrate soft tissue edema - early
- acute osteomyelitis
  - Large, irregular cavities; raised periosteum;
- sequestra; or dense bone formations in chronic osteomyelitis,
- Blood studies- leukocytosis & elevated ESR.
- Wound and blood culture performed, although they are only positive in 50% of cases.

Medical Management osteomyelitis

- Pharmacologic Therapy
- Culture specimens are obtained, IV antibiotic
- • After results of the culture and sensitivity studies are
- known, an antibiotic to which the causative organism
- is sensitive is prescribed.
- Iv antibiotic therapy continues for 3 to 6 weeks.
- • After the infection appears to be controlled, the
- antibiotic may be administered orally for up to 3
- months.

Medical Management ofosteomyelitis

- Initial goal of therapy is to:
- - Control & halt the infective process.
- Antibiotic therapy depends on the results of blood and wound cultures.
- Supportive measures (e.g., Hydration, diet high in vitamins and protein, correction of anaemia) should be instituted.
- Immobilized affected area

Surgical Management osteomyelitis

- Chronic & does not respond to antibiotic, surgical
- debridement
- - Infected bone is surgically exposed, and irrigated with
- sterile saline solution.
- Iv antibiotic therapy is continued.
- ・ A sequestrectomy is performed.
- ・ A closed suction irrigation system may be used to
- remove debris.
- ・Wound irrigation using sterile physiologic saline
- solution may be performed for 7 to 8 days.

Nursing management osteomyelitis

- Relieving pain
- Improving physical mobility
- Controlling the infectious process
- Promoting home and community-based care


Thank You

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