

Musculoskeletal System Osteoarthritis & Rheumatoid Arthritis

Connective Tissue Diseases (CTD)

- Rheumatology – study of rheumatic diseases
- Rheumatic disease – any disease or condition involving the musculoskeletal system
- Connective tissue diseases – usually classified as autoimmune disorders

Arthritis

- Inflammation of a joint
- 1 in every 4 persons in the U.S. has some form of arthritis
- Warning signs are often ignored

- **Classifications:**

- **Inflammatory**

- Rheumatoid- like

- RA, scleroderma, lupus, polymyositis, lyme disease

- Spondylarthropathy – diseases of the joints of the spine

- Ankylosing spondylitis

- **Degenerative**

- Osteoarthritis

- **Metabolic**

- Gout, hyperlipidemia

- **Collagen Diseases**

- skeletal muscles, bones, & joints

Osteoarthritis

- Degenerative Joint Disease (DJD)
- Symptomatic osteoarthritis appears in the ages of 50-70 yrs
- Before age 50, males > females
- Incidence of OA after 50 is 2x as great in females > estrogen reduction at menopause

- Etiology:

- Unknown

- “wear & tear” disease

- Many contributors = **aging, trauma, obesity, infection, congenital abnormalities, smoking**

- Genetic predisposition

- Primary cause → unknown (idiopathic)

- Secondary cause → trauma, obesity

- **Pathophysiology:**

- A disease of the articular cartilage; noninflammatory; disorder of the diarthrodial (synovial) joints

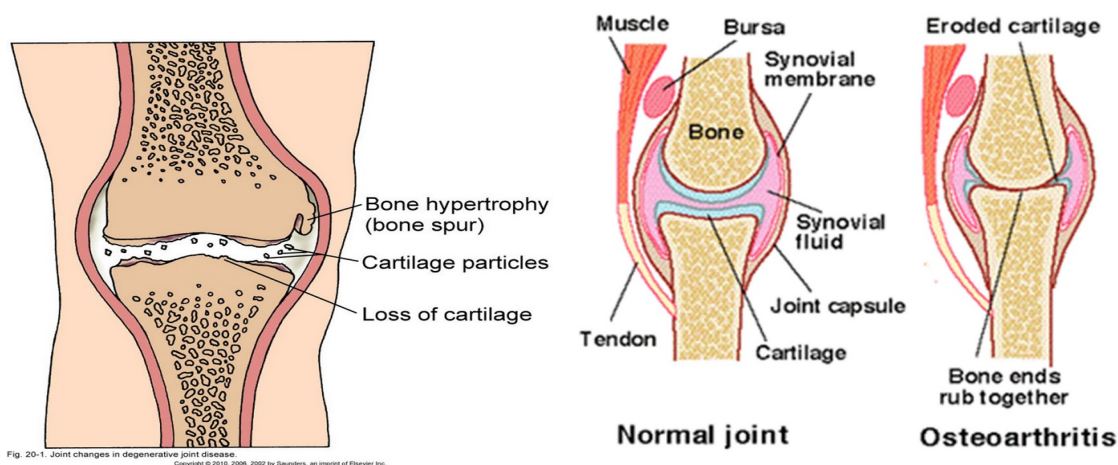
- Normal articular cartilage: Smooth, White, Translucent

- Affected Cartilage:

- Dull, yellow, granular

- Softer, less elastic

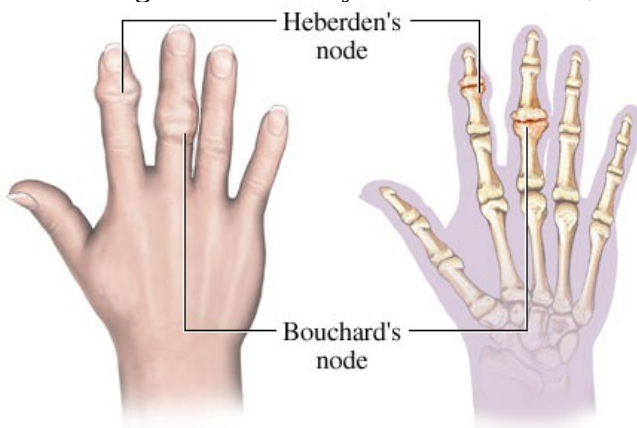
- Less able to resist wear
- Areas of cartilage soften & the surface becomes rough, frayed, & cracked → eventually destroyed
 - Metabolic response at level of chondrocytes
 - Body's attempt to repair cannot keep up
- Fissuring and erosion (cracking & grooves)
- Central cartilage becomes thinner
- Spurs or osteophytes appear at the joint surfaces and increase at joint margins
- Incongruent joint surfaces create:
 - Uneven distribution of stress across the joint
 - Reduction in motion
- **Secondary synovitis**
- **Inflammatory changes** → phagocytes ridding the joint of the tiny cartilage pieces torn away from the joint surface = **early pain and stiffness (treat with anti-inflammatories)**
- Osteoarthritis affects only the joints & their surrounding tissues



- **Clinical Manifestations**
- No systemic manifestations
- Joint pain
 - Predominant symptom
 - Relieved by rest in early stages
 - Generally worsens with joint use
 - May become worse as barometric pressures fall
 - Affects joints asymmetrically
 - Early morning stiffness
- Resolves within 30 minutes
- May be referred to:
 - Groin
 - Buttock
 - Medial side of thigh or knee
- Crepitation
 - Grating sensation caused by loose particles of cartilage
 - Coxarthrosis- pain in the hip on weight bearing with pain progressing to indicate groin and medial knee
- Most Commonly Involved Joints: (**limited ROM or decreased ROM**)

- Distal interphalangeal (DIP)
 - Proximal interphalangeal (PIP)
 - Carpometacarpal joint of the thumb
 - Weight-bearing joints (hips, knees)
 - Metatarsophalangeal (MTP)
 - Cervical and lower lumbar vertebrae
- Deformity
 - Heberden's nodes: bulge or swelling; red swollen tender
 - DIP joints- dorsal
 - Indication of osteophyte formation
 - Bouchard's nodes: red, swollen, tender
 - PIP joints

*Even though OA is not a symmetrical disease, the node deformities can occur bilaterally



- Deformity
 - Knee involvement
 - Varus - bowlegged
 - Valgus – knock-kneed
 - Flexion deformity
 - Crepitus
 - ↓ ROM
- **Diagnostic Studies**
 - X-Ray = narrow joint space & osteophytes; confirmation & stage of damage
 - Bone Scan
 - CT
 - MRI – early dx
 - ESR & CRP – r/o RA
 - CBC – baseline for tx
 - Synovial fluid – OA vs. other inflammatory arthritis
 - **Medical Management:**
 - Objectives
 - Relief of pain
 - Restoration function
 - Prevention of disability or further progression

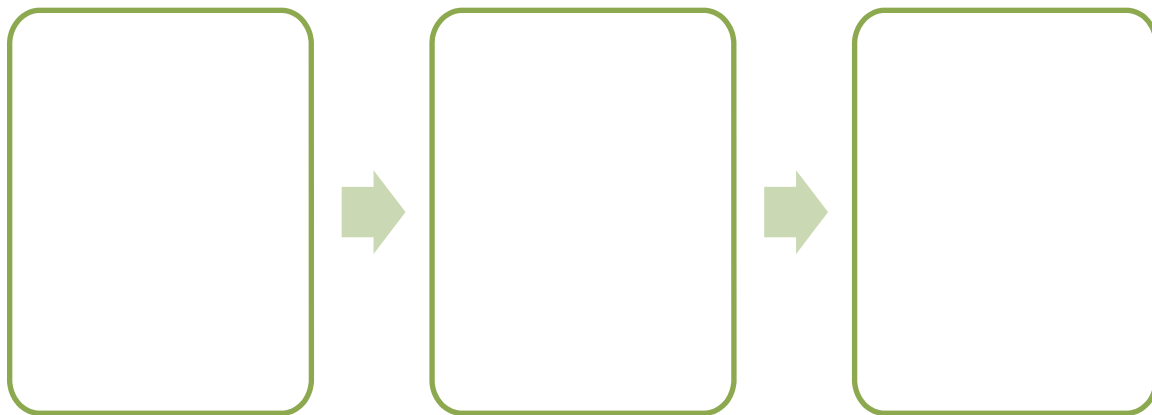
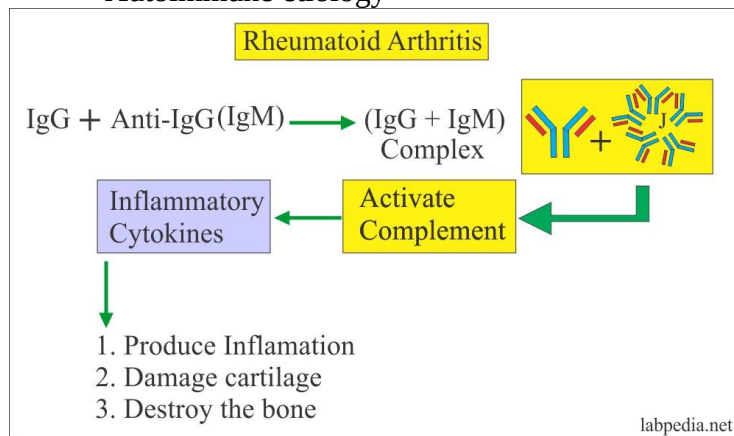
- **Drug therapy:**
 - Want to ↓ pain & inflammation
 - Based on the severity of symptoms
 - Acetaminophen (Tylenol)
 - Topical agents (capsaicin cream/Capsin - alkaloid derived from hot peppers; trolamine salicylate/Aspercreme; menthol/Bengay)
 - NSAIDS (Celecoxib) – monitor kidneys
 - Intra-articular injection of steroids
 - Non-opioid & opioid analgesics (oxycontin, oxycodone, hydrocodone)
 - Glucosamine & Chondroitin- glucosamine plays a role in synthesis of new cartilage (naturally occurring)
 - Hyaluronic acid (viscosity and elasticity of synovial fluid)
 - Synvisc- viscosity; lubricating properties; intra-articular injection; S/fx = knee pain, swelling, rash
 - Hyalgan- 3 weekly injections; anti-inflammatory benefits; short-term lubrication
 - Supplements: ginger, fish oil – anti-inflammatory properties
- Physical Therapy- balance rest and activity; avoid immobilization; modify activities to reduce stress
 - Heat / Cold:
 - May help reduce pain and stiffness
 - Ice
 - Acute inflammation
 - Heat
 - Stiffness
 - Assistive devices- helps unload painful wt bearing
 - Rest- during acute phases
 - Exercise
 - Joint protection – splinting, immobilization, not to exceed > 1 wk
 - Weight loss
- Nutritional therapy and exercise
 - Weight-reduction plan
- Complementary and alternative therapies
 - Acupuncture
 - Yoga
 - Tai Chi
- Surgery – after conservative therapy
 - Remove bits of broken cartilage or bone → arthroscopy

- Realignment → osteotomy
- Fusion → arthrodesis
- Joint replacement → arthroplasty

- **Nursing Management**
 - Nursing Assessment:
 - Type, location, severity, frequency, and duration of joint pain and stiffness
 - Pain relieving practices
 - Nursing Diagnosis:
 - Acute / chronic pain
 - Disturbed sleep pattern
 - Impaired physical mobility
 - Self-care deficits
 - Imbalanced nutrition: More than body requirements
 - Chronic low self-esteem
 - Acute Intervention:
 - Pain management
 - Teaching – all related to OA: tx's, devices, exercise programs, balance rest and exercise, weight management
 - Health Promotion- eliminate modifiable risk factors- weight loss, decrease hazards, fitness programs
 - Ambulatory & Home care: modify environment for safety

Rheumatoid Arthritis

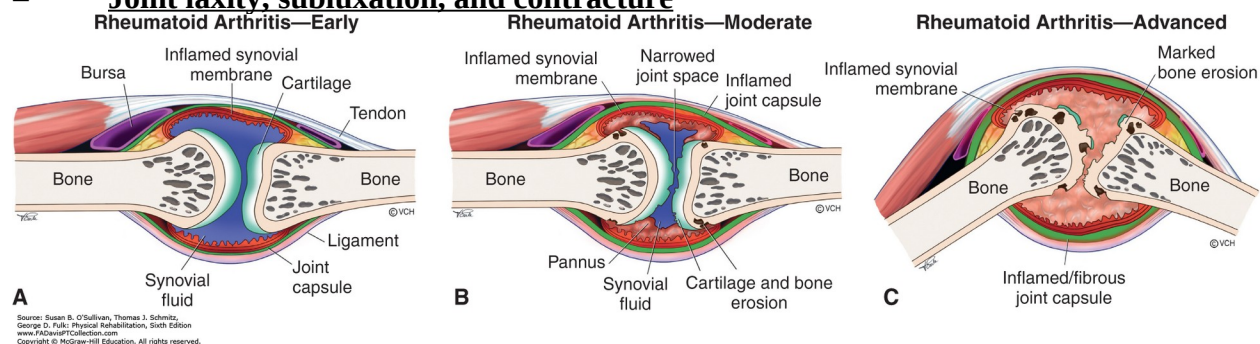
- A chronic, systemic autoimmune disease characterized by inflammation of connective tissue in the diarthrodial (synovial) joints
- **Periods of remission and exacerbation**
- Affects all ethnic groups
- Can occur at any time of life
- Often during productive years of life
- Incidence increases with age
- Women 2-3x > men
- Smoking
- **Etiology**
- Cause of RA is unknown (genetic & environmental)
- No infectious agent
- Autoimmune etiology



- **Pathophysiology (Autoimmunity)**
- Changes begin when a susceptible host experiences an initial immune response to an antigen
- Antigen triggers the formation of an abnormal immunoglobulin G (IgG)
- RA = + autoantibodies (rheumatoid factor [RF])
- RF and IgG make immune complexes that initially deposit on synovial membranes or superficial articular cartilage in the joints
- An inflammatory response
 - Neutrophils are attracted to the site of inflammation and release enzymes that can damage

articular cartilage

- Continued inflammation leads to thickening of the synovium, particularly where it joins the articular cartilage
- Joint changes from chronic inflammation begin when the hypertrophied synovial membrane invades the surrounding *cartilage, ligaments, tendons, & joint capsule*.
- **Pannus** - within the joint
 - Highly vascular granulation inflammatory tissue
- Eventually covers and erodes the entire surface of the articular cartilage
- Pannus scars and shortens supporting structures
 - Tendons & ligaments
- **Joint laxity, subluxation, and contracture**



- Genetic predisposition
- Strongest evidence for a familial influence is the increased occurrence of certain human leukocyte antigens (HLA)

• **Stages of RA (Progression)**

- Stage 1 - Early
 - No destructive changes on x-ray, possible x-ray evidence of osteoporosis, synovitis occurring
- Stage II – Moderate
 - X-ray evidence of osteoporosis, with or without slight bone or cartilage destruction
 - No joint deformities, some ↓ ROM
 - Muscle atrophy
 - Possible extra-articular soft tissue lesions
 - Pannus formation → into joint capsule
- Stage III – Severe
 - X-ray evidence of cartilage and bone destruction in addition to osteoporosis
 - Joint deformity
 - Extensive muscle atrophy
 - Possible extra-articular soft tissue lesions
- Stage IV – Terminal
 - Fibrous tissue replaces pannus or bony ankylosis – fibrous tissue calcification
 - Criteria of stage III
 - **Total joint immobilization**

Stages of Rheumatoid Arthritis

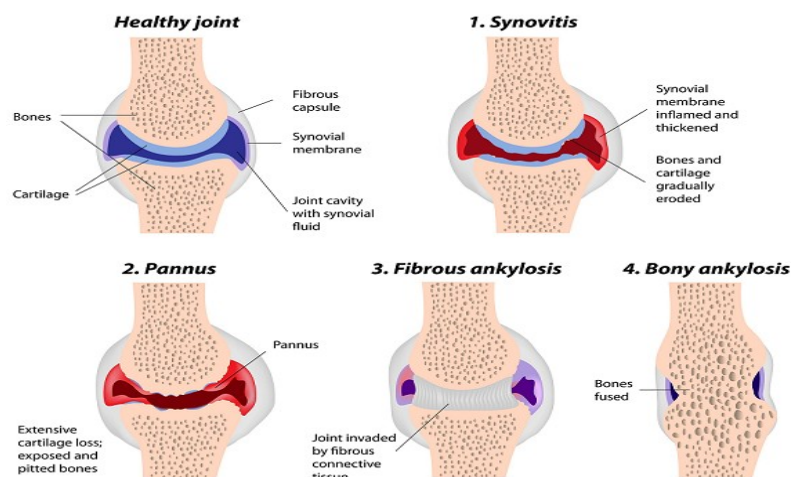
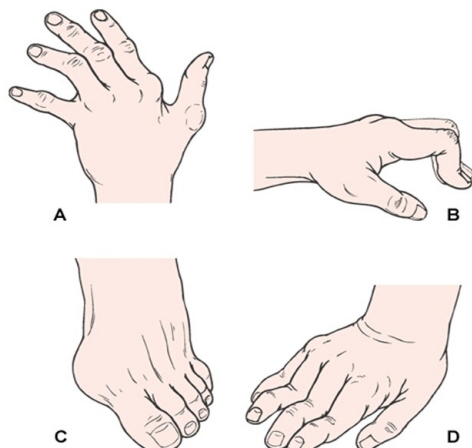


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- **Clinical Manifestations**
 - Onset = insidious
 - Classified as: **Early or late disease; articular or extraarticular**
 - **Nonspecific manifestations before arthritic complaints**
 - Fatigue
 - Anorexia
 - Weight loss
 - Generalized stiffness
 - Stiffness → localized in weeks to months
 - History of precipitating stressful events
- Specific **articular** involvement:
 - Pain
 - Stiffness
 - Limitation of motion
 - Signs of inflammation:
 - Joint symptoms- symmetrically
 - Small joints - hands and feet
 - Larger peripheral joints
 - Wrists, elbows, shoulders, knees, hips, ankles, and jaw
 - Cervical spine
 - Joint stiffness after periods of inactivity
 - Morning stiffness - 60 minutes to several hours
 - Joints - tender, painful, and warm
 - Joint pain:
 - Increases with motion
 - Varies in intensity
 - May not be proportional to the degree of inflammation
 - Tenosynovitis – inflammation of the tendon and its sheath
 - grasp objects
 - Inflammation and fibrosis > deformity and disability

— Subluxation

Joint Manifestations



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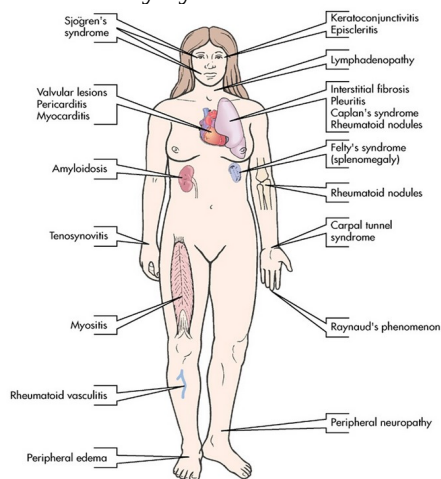
- A. Ulnar Drift
- B. Boutonniere Deformity
- C. Hallux Valgus (bunion)
- D. Swan-Neck Deformity

- **Extra-articular Clinical Manifestations**

- every system of the body
- vasculitis

- 3 most common

- Rheumatoid nodules – painless, subcutaneous nodules
- Sjögren syndrome
- Felty syndrome



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- **Rheumatoid Nodules:**

- Usually have high titers of RF
- Appear as **firm, nontender, granuloma-type** masses
- over the extensor surfaces of joints such as **fingers and elbows**
- Nodules at the base of the spine and back of the head are common in older adults
- Develop insidiously
- Can persist or regress spontaneously
- Usually not removed

- Sjögren Syndrome:
 - 10% to 15%
 - Can occur as a disease by itself or in conjunction
 - **Diminished lacrimal and salivary gland secretion**
- Burning, gritty, itchy eyes, decreased tearing, photosensitivity

- Felty Syndrome:
 - Occurs most commonly in patients with severe, nodule-forming RA
 - Characterized by:
 - Splenomegaly & ↓ WBC count

- **Complications:**
 - Flexion contractures and hand deformities
 - Diminished grasp strength
 - Affects self-care tasks
 - Nodular myositis and muscle fiber degeneration >>> pain similar to that of vascular insufficiency
 - Cataract and loss of vision
 - Rheumatoid nodules can ulcerate
 - Hoarseness
 - Bone destruction from nodules in the vertebral bodies
 - Cardiopulmonary effects later:
 - Pleurisy, pleural effusion, pericarditis, pericardial effusion, cardiomyopathy
 - Carpal tunnel syndrome

- **Diagnostic Studies:**
 - Accurate diagnosis = essential
 - Appropriate treatment
 - Prevention of disability

- Positive RF
 - abnormal antibodies
- ESR and C-reactive protein (CRP) = active inflammation
 - + ANA – antinuclear antibody
 - + anti-CCP– anti-citrullinated protein antibody
- Joint Aspiration = cloudy, ↑ WBC, ↑ MMP-3
- X-rays not specifically diagnostic of RA – late dx (misalignment & ankylosis)
- Bone scans - detecting **early joint changes** and confirming a diagnosis
- Arthroscopy → tissue biopsy
- Inflammation

- **Collaborative Care:**
 - Care of the patient
 - Drug therapy and education
 - Physical therapy
 - Occupational therapy

Drug Therapy:

Disease-modifying antirheumatic drugs (DMARDs)

–Side Effects: anemia, low WBC, low plt, check CBC, UA- proteinuria, LFT's

- methotrexate- rapid anti-inflammatory effect
 - works within 4-6 weeks
 - frequent monitoring
 - early treatment
 - may use in conjunction if no relief
- leflunomide (Arava)- anti-inflammatory; blocks immune cell overproduction
 - teratogenic
- sulfasalazine (Azulfidine)- for mild to mod, dec inflammation and slows disease process

Antimalarials (subdivision DMARDs)

for persistent arthritis; unknown effect, may suppress antigen formation; decreases inflammation and slows disease process

– hydroxychloroquine/Plaquenil

–Side effects

»retinopathy- rare, irreversible degeneration may occur; drug deposits in pigment layer of retina

–Takes 4-6 months to see effects; requires Eye exams baseline & yearly

Gold Salts (subdivision of DMARDs)

Not in use as much; inflammatory suppressive effect; alters immune responses and decreases prostaglandin synthesis

–Parenteral: deep IM weekly x 5 months

–Po – auranofin/Ridaura

–Side Effects: rash, oral ulcers, indigestion

–Takes 3-6 months to see effects

Biologic Therapy/Biologic Response Modifiers/Immunotherapy (subdivision immunosuppressant's)

– etanercept/Enbrel: give SC, decreases inflammatory and immune responses

– s/fx: injection site reaction, erythema, pain, swelling, abd pain, dizziness, vomiting, HA

– infliximab/Remicade: given with methotrexate, IV; antibodies - decrease infiltration of inflammatory cells

– s/fx: abd pain, N/V, dizziness, HA

– Adalimumab/Humira: decreases inflammation, tenderness swelling of joints, slows or prevents progressive destruction of joints

– SC injection every other week and may increase to weekly if not on methotrexate

- s/fx: injection site, HA, rash, sinusitis; DO NOT receive live vaccines

NSAIDs – nonsteroidal anti-inflammatory drugs inhibit synthesis of prostaglandins

–celecoxib/Celebrex – Cox 2 inhibitors

–Ibuprofen (advil, motrin)

–indomethacin/indocin, naproxen/naprosyn, diclofenac/volteran, tolmetin/tolectin, meloxicam/Mobic

–Side Effects of NSAIDs: dyspepsia, ulcers, hemorrhage, GI irritation, HA, dizziness; check RFP & LFT's

Salicylates – Aspirin

- 3-4 g / day
- Takes 2-3 weeks to see effects
- Side Effects: gi irritation, hypersensitivity, prolonged bleeding time
- Teach: take with meals if gi upset, enteric coated to prevent irritation
- » Salicylism – nausea, tinnitus, dizziness

Corticosteroids – anti-inflammatory analgesic

- Helps manage symptoms during flares
- Prednisone, methylprednisolone, solumedrol (IV)
- Intraarticular: temporarily reduce pain and inflammation
- Oral: low dose, limited time
- Not for long-term use
- Complications of use:

–**Side Effects of steroids:** suppression of local infection, intra articular, cushing's syndrome, fluid retention, gi irritation, OP, HTN, poor wound healing, hyperglycemia, bruising: Teach to TAPER!

Drug therapy- depends on disease activity, level of function, lifestyle

- Nutritional Therapy:
 - Balanced nutrition
 - Weight loss
- loss of appetite
- Inability to shop for and prepare foods
 - Corticosteroids or immobility - unwanted weight gain
 - Exercise reduces stress on arthritic joints
 - Weight slowly adjusts to normal several months after cessation of therapy
- **Acute Interventions:**
 - Goals in the management of RA
 - Reduction of inflammation
 - Manage pain

- Maintenance of joint function
- Prevention or correction of joint deformity

Ambulatory Care

- Comprehensive program to meet goals
- Drug therapy
- Rest
- Joint protection
- Heat and cold applications
- Exercise
- Patient and family teaching
- Lightweight splints
- Rest inflamed joints and prevent deformity
- Skin care
- Range-of-motion exercises
- **Ambulatory & Home Care**
- Alternate rest and activity
- Relieve fatigue and pain
- Rest before becoming exhausted
- Modify daily activities
- Body alignment
 - Firm mattress
 - Bed board
- Positions of extension
- **Avoid flexion**
- **Lying prone for half an hour twice daily**
- **Joint Protection**
- Energy conservation
- Work simplification techniques: short periods, rest breaks, spread it out
- OT – assistive devices for ADL's
- **Heat & Cold Therapy**
- Help relieve stiffness, pain, and muscle spasm
- Cold (<10 to 15 minutes at a time)
 - Beneficial during periods of disease exacerbation
- Moist heat (<20 minutes at a time)
 - Relief of chronic stiffness
- Topical heat-creams
- **Exercise**
- Gentle ROM - daily
- Usual daily activities do not provide adequate exercise to maintain joint function.
- During acute inflammation, exercise should be limited to 1 to 2 repetitions.
- **Psychological Support**
- Must have a thorough understanding of RA
- The patient is constantly threatened by problems
 - Limited function

- Self-esteem
- Body image
- Fear of disability and deformity
- Help the patient recognize fears and concerns
- Evaluation of family support
- Financial planning, Community resources, Self-help groups