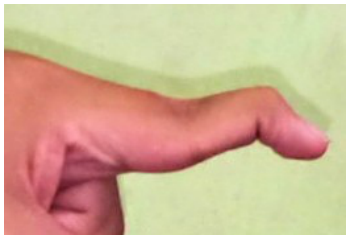
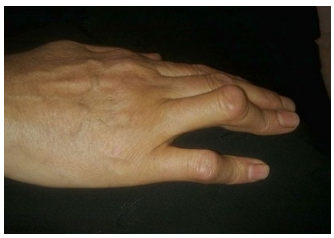
Rheumatoid Arthritis

Summary Statement: Autoimmune mediated chronic inflammatory arthritis leading to joint destruction
Clinical Manifestations: Symmetric joint swelling with morning stiffness that improves with activity
Diagnosis: 3 joint involvement, symptoms present for >6 weeks, elevated ESR/CRP, + RF/ACPA
Treatment: NSAIDs +/- prednisone +/- DMARDs (Methotrexate plus folic acid is the mainstay)

- Pathophysiology:
  - **MC chronic inflammatory arthritis** that is caused by both genetic and environmental factors
    - Etiology is not exactly understood. It is thought that there are genetic markers (class II major histocompatibility antigens) leading to the disease but that environmental triggers such as cigarette smoking can lead to increased severity and earlier onset of the manifestations
  - Patho → **Autoimmune response causing immune mediated destruction of synovial joints** (synovium delivers nutrients for cartilage as well as provides joint lubrication with hyaluronic acid and collagen) → **Foreign major histocompatibility antigen** triggers CD4 T cell response → B cell and T cells are activated, leading to immune complex formation → Macrophages are activated which leads to cytokine formation and release of tumor necrosis factors as well as **rheumatoid factor**→ Endothelial cells release adhesion molecules, causing inflammatory cells to accumulate → **Anti-citrullinated protein antibodies** begin to accumulate as a response → Pannus formation (extra growth of the joints) develops → Damage to bone, cartilage, and overall joint is **irreversible**
- Clinical manifestations:
  - Polyarticular disease with a gradual onset of **symmetric joint swelling and pain**
    - Metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints of the fingers
  - **Morning stiffness is most common and improves throughout the day**
    - Stiffness after any period of inactivity is common in these patients
  - Patients complain about inability to preform ADL's → Walking, climbing stairs, opening jars, etc.
  - Systemic symptoms more likely with advanced age but include myalgia, weight loss, fatigue
- Diagnosis:
  - **Diagnostic criteria** (all need to be met) → Inflammatory arthritis involving at least 3 joints, symptoms present for > 6 weeks, elevated CRP and/or ESR, + RF and/or ACPA, and all other joint disorders have been excluded (SLE, gout, osteoporosis, etc)
  - Physical exam → Symmetric joint swelling from synovial thickening MC in the peripheral joints (axial and central joints can be seen but is much less common)
    - Local tenderness from pressure applied on joints +/- joint effusions secondary to synovial hypertrophy
    - **Swan neck deformity** → Hyperextension of the PIP joint and flexion of the DIP joint
    - **Boutonniere deformity** → Flexed at the proximal interphalangeal joint (PIP) and hyperextension at the distal interphalangeal joint (DIP)
    - Ulnar deviation → Wrist joint shifts towards the ulna bone (fingers bend medially)



SWAN NECK DEFORMITY VIA WIKICOMMONS



BOUTONNIERE DEFORMITY IN TWO FINGERS VIA WIKICOMMONS

  - Labs
    - Blood tests:
      - Rheumatoid factor (RF) is present in 75-80% of patients as it is >98% sensitive, however it is not specific (can be positive in up to 10 of healthy individuals, 30% of patients with SLE, and in other diseases/disorders)
      - Inflammatory markers → Elevated ESR and CRP
      - **Anti-citrullinated peptide (ACPA)** → Just as sensitive as RF but up to 98% specific (better test)

        - Synovial fluid not commonly analyzed but when done, minorly elevated leukocyte count (polymorphonuclear cells) as well as low C3 and C4 complement levels are found
    - Imaging → Plain x-rays of the joints can reveal **joint subluxation,** osteopenia, joint space narrowing, degenerative disease
        - Commonly done as patients are being worked up for joint pain and to rule out injury/fracture
- Treatment:
    - Supportive measures → Smoking cessation as this is a trigger, rest, physical therapy (as tolerated), joint splinting to relieve severe pain sometimes indicated, heat application to help improve muscle mobility
    - Analgesics → **NSAIDs** as needed
    - DMARDS (Disease modifying antirheumatic drugs) → **Methotrexate (MTX) 10-15mg PO once weekly with daily folic acid supplementation**
        - Other drugs such as tumor necrosis factor alpha antagonists, interleukin inhibitors, JAK inhibitors can help to slow the progression of RA
        - Biologic agents added if MTX alone is not adequate → Hydroxychloroquine, Leflunomide, Sulfasalazine, Rituximab, Anakinra, Abatacept, etc.
    - **Low dose Prednisone** can be added (<10mg/day) to help control severe symptoms
    - Surgery → Arthroplasty with prosthetic joint replacement if joint is so damaged that function is severely limited