
# Oh My Aching Joints: An Effective Approach to Persons with Joint Pain

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# Disclosures

Non-Declaration Statement: I have no relevant relationships with ineligible companies to disclose within the past 24 months. (Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.)

# Objectives

**After completing this session, attendees will be able to:**

- **distinguish between common conditions included in a differential diagnosis when a person presents with polyarticular arthralgia.**
- **choose ancillary laboratory and radiographic studies to support a suspected diagnosis when a person presents with polyarticular arthralgia.**
- **Identify pharmacologic and non-pharmacologic treatments for polyarticular arthralgia.**

# Question 1

**1. Extra-articular manifestations are associated with the following types of arthritis except:**

a. Ankylosing Spondylitis
b. Gout
c. Osteoarthritis
d. Rheumatoid arthritis

# Question 2

2. **Gout is definitely diagnosed by:**

**a. noting an elevated serum uric acid on laboratory.**

**b. detecting strongly negative birefringent crystals using polarized light microscopy.**

**c. detecting weakly positive birefringent crystals using polarized light microscopy.**

**d. detecting calcium pyrophosphate crystals using polarized light microscopy.**

# Question 3

**3. Which of the following screening tests is recommended prior to starting a biologic medication for the treatment of rheumatic disease?**

a. Computed tomography of the small joints of the hands

b. Hemoglobin A1C

c. Magnetic resonance imaging of the lungs

d. Tuberculosis screening, ppd or IGRA

Icing=Lab and X-rays

Cake=History and Physical

# History of Present Illness with arthralgias…

- Mono-, oligo-, or polyarticular
- Acute vs. chronic
- Gender and age of patient
- Location, location, location
- Temporal pattern of joint involvement
- Systemic features, constitutional symptoms
- Inflammatory vs. non-inflammatory

CHART #: _____

**REVIEW OF SYSTEMS:**

**GENERAL:**
- fatigue
- fever
- weight loss
- Raynauds
- sleep disturbance
- lymphadenopathy
- Health Maint. UTD?

**NERVOUS SYSTEM:**
- HA
- numbness
- m. weakness
- seizure

**HEENT:**
- inflamm eye sxs
- sicca
- oral lesions
- tinnitus
- viz changes
- scalp tenderness
- jaw claudication

**CARDIO-PULM:**
- chest pain
- SOB
- pleurisy
- cough

**PAST MEDICAL HX:**

CHILD: Rh Fever
other

ADULT: DM
HTN
ASCVD
COPD
cancer
hepatitis/cirrhosis
TB
DVT
PUD
Transfusions

SURGERY:

ALLERGIES/ADVERSE RXNS:

**GASTRO:**
- abdom pain
- dyspepsia
- dysphagia
- diarrhea
- blood

**GENITO-URIN-RENAL:**
- change urine color
- discharge
- dysuria
- vaginal dryness
- ulcers
- rash
- stones

**MENSTRUAL:**
- pregnancies
- miscarriages
- LNMP
- contraception

**DERMATOLOGIC:**
- rash
- sun sensitive
- hair loss
- nail changes
- tightness
- psoriasis

**SOCIAL:**
- Marital status
- occupation
- travel
- cigs
- ETOH

**FAMILY:**
- CTD
- Arthritis
- other

# Diseases With Acute Polyarthritis Symptoms

| Infection | Other inflammatory |
|---|---|
| Gonococcal | Rheumatoid arthritis |
| Meningococcal | Polyarticular and systemic juvenile idiopathic arthritis |
| Lyme | Acute sarcoid arthritis |
| Acute rheumatic fever | Systemic lupus erythematosus |
| Infective endocarditis | Reactive arthritis |
| Viral (esp. rubella, hepatitis B and C, parvovirus, EBV, HIV) | Psoriatic arthritis |
| | Polyarticular gout |

Rheumatology Secrets, 4th edition

# Diseases With Chronic Polyarticular Arthritis Symptoms

| Inflammatory | Noninflammatory |
|---|---|
| Rheumatoid arthritis | Osteoarthritis |
| Systemic lupus erythematosus | Chronic CPPD (pseudogout) |
| Polyarticular gout | Fibromyalgia |
| Juvenile idiopathic arthritis | Hemochromatosis |
| Systemic sclerosis | Benign hypermobility syndrome |
| Chronic CPPD (pseudogout) | |
| Psoriatic arthritis | |
| Polymyalgia rheumatica | |
| Vasculitis | |
| Reactive arthritis | |
| Enteropathic arthritis | |
| Sarcoid arthritis | |

Rheumatology Secrets, 4th edition

# Rheumatic disease

- Reduced quality of life
- Increased comorbidity
- Reduced life expectancy
- Socioeconomic burden

# Case 1

**74-year-old female, widowed, brought to see you by her daughter who noted unique changes in her hands**

**Previous known history of osteoarthritis in hands**

**Pt reports no recent increase of hand arthralgia from her baseline, but has had periodic bouts of red and swollen joints for which she has not sought medical care**

**(-)RF/CCP**

**PMH:  HTN on HCTZ daily**

# ARS question

**What is your diagnosis?**

**a- Seronegative Rheumatoid Arthritis**

**b- Tophaceous Gout**

**c- Pseudogout**

**d- Osteoarthritis**

# ARS question

**What would be your recommended treatment?**

**a- Methotrexate**

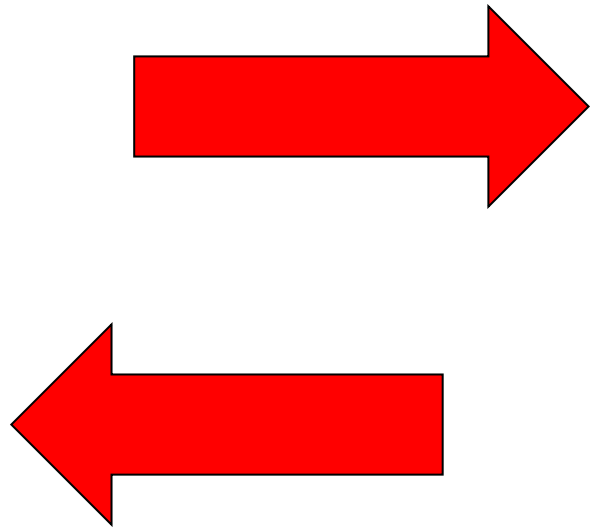
**b- Prednisone**

**c- Allopurinol**

**d- Colchicine**

# Tophaceous Gout

# Chondrocalcinosis



# SYNOVIAL FLUID ANALYSIS

| Condition | Color | Clarity | WBC | Crystals | C&S |
|---|---|---|---|---|---|
| **OSTEO** | Amber | Clear | 200 -2,000 | – | – |
| **TRAUMA** | Pink Red | Clear-opaque | <2,000 | – | – |
| **INFLAM-MATORY** | Yellow | Cloudy | 2000-50,000 | –<br>+ | – |
| **INFECTION** | Purulent | Opaque | >50,000 (>95%PMNs) | –<br>+ | + |

# Calcium Pyrophosphate Dihydrate crystals

**Weakly positive birefringence**

**Perpendicular=yellow**

**Parallel=blue**

# Monosodium Urate crystals

**Strongly negatively birefringent**

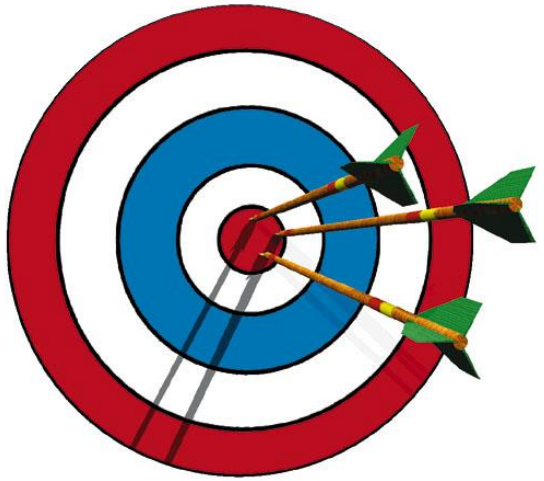
**Perpendicular=blue**

**Parallel=bright yellow**

# Gout: Treat to target

allopurinol
or
febuxostat

probenecid
fenofibrate
or losartan



Single agent XOI → Uricosuric → Pegloticase

# Case 2

24 y.o. ♂ with arthritis sxs since age 13

Left great toe with pain/swelling, sudden onset

Feet, hands (MCPs, PIPs), wrists, elbows, knees, shoulder

Multiple right knee aspirations, inflammatory fluid

Dx-RA

Tx-MTX/folic acid, Naproxen

# Case 2 (continued)

16 y.o. Sxs persist with tx

Tx-etanercept added, helped significantly (pt reduced dose from Q week to Q month)

22y.o.-onset of atraumatic low back pain

↑-inactivity, in the morning

↓-activity, exercise, stretching

PMH- eczema, otherwise negative

SH- (-)tobacco, EtOH

FH- maternal aunt-RA

# Case 2

**Exam-** flesh-colored patches on BUE proximally and peri-axillae area.

No synovitis in peripheral joints.

No secondary degenerative arthritis changes.

Mild tenderness with direct palpation over bilateral SI joints.

Otherwise(-).

**Lab-** (-) RF/CCP

CBC/CMP wnl except ALT-51

# ARS Question

**What next?**

**a-continue current regimen without change as diagnosis is RA.**

**b-ask pt to take etanercept weekly as approved by FDA for RA.**

**c-additional laboratory for LBP. (HLA-B27, SI joint x-rays).**

**d-L-spine MRI for LBP.**

# Low Back Pain

94%

## Mechanical

AM stiffness
Usually minor

Maximum pain/stiffness
Late in day

Exercise/activity
Worsens symptoms

Duration Acute or chronic

Age at onset 20-65 years

Radiographs
Osteophytes
Disc space narrowing
Vertebral malalignment

1%

## Pathological
(Tumor/Infection/Fracture)

Onset > 60 years
Progressive over weeks
Night/rest pain
Systemic symptoms
H/O Malignancy
Infection
osteoporosis risk factors
Trauma

5%

## Inflammatory

AM stiffness
Usually prolonged

Maximum pain/stiffness
After midnight, early AM

Exercise/activity
Improves symptoms

Duration Chronic

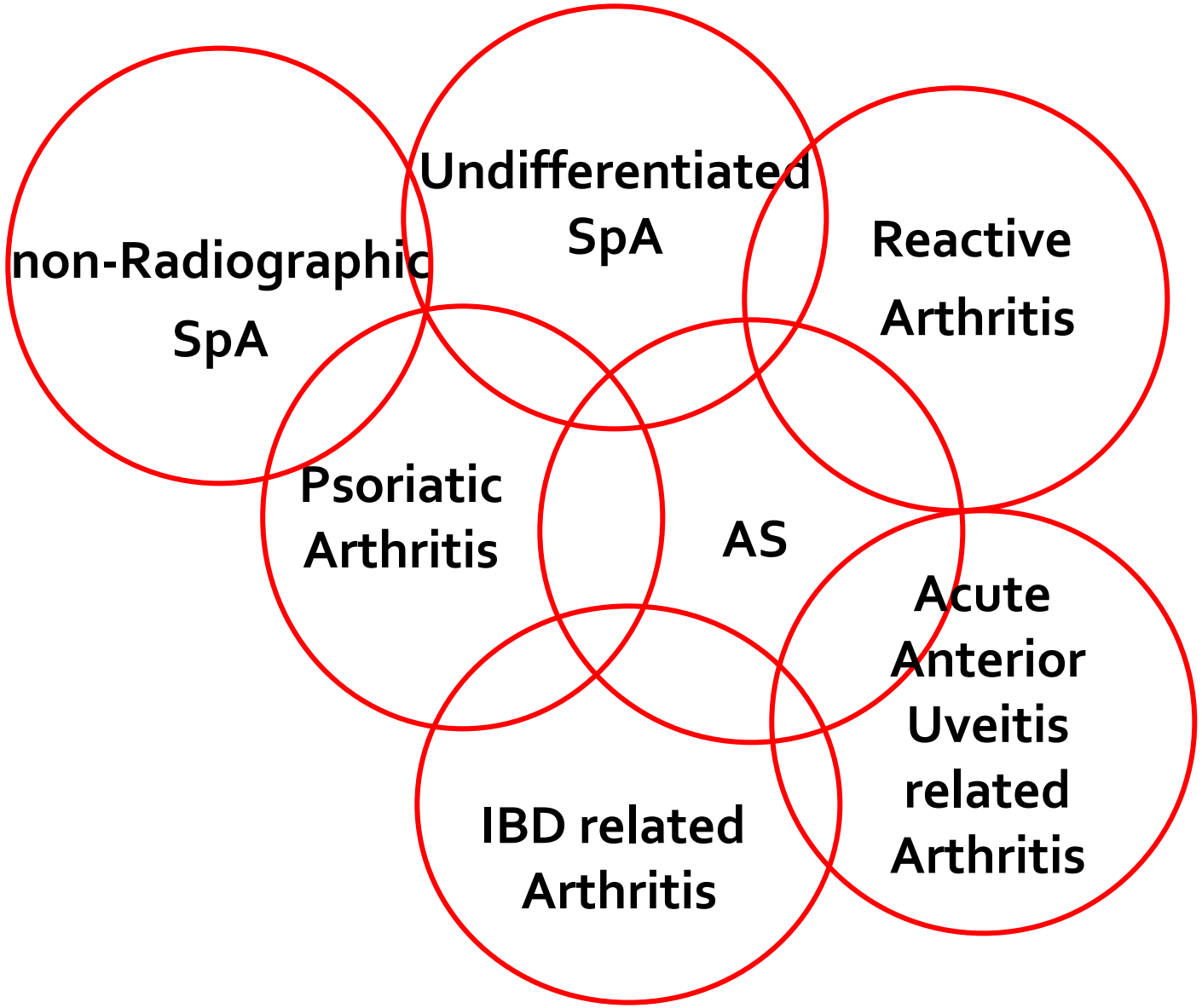
Age at onset <40 years

Radiographs
Sacroiliitis,
Syndesmophytes
Spinal ankylosis

# Inflammatory vs. Mechanical Back Pain

| | Inflammatory Back Pain | Mechanical Back Pain |
|---|---|---|
| **AM stiffness** | Usually prolonged | Usually minor |
| **Maximum pain/stiffness** | After midnight & early morning | Late in day |
| **Exercise/ activity** | Improves symptoms | Worsens symptoms |
| **Duration** | Chronic | Acute or chronic |
| **Age at onset** | 12-40 years | 20-65 years |
| **Radiographs** | Sacroiliitis,<br>Syndesmophytes<br>Spinal ankylosis | Osteophytes<br>Disc space narrowing<br>Vertebral malalignment |

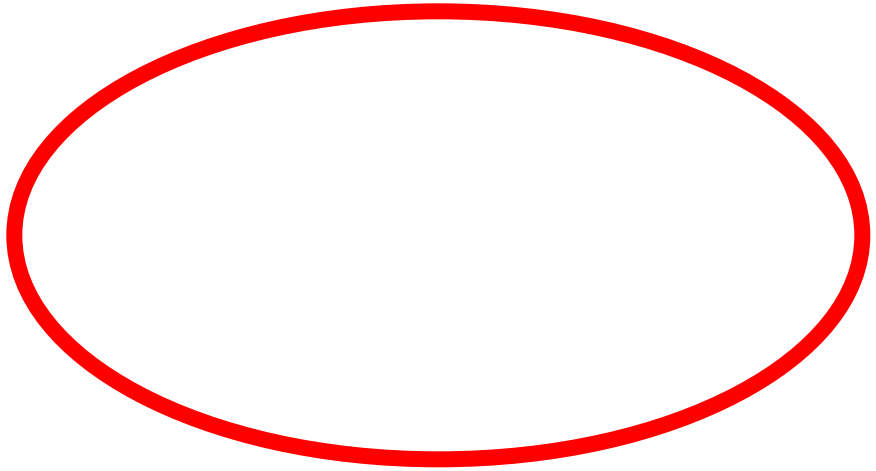
# The Spondyloarthritis (SpA) Group



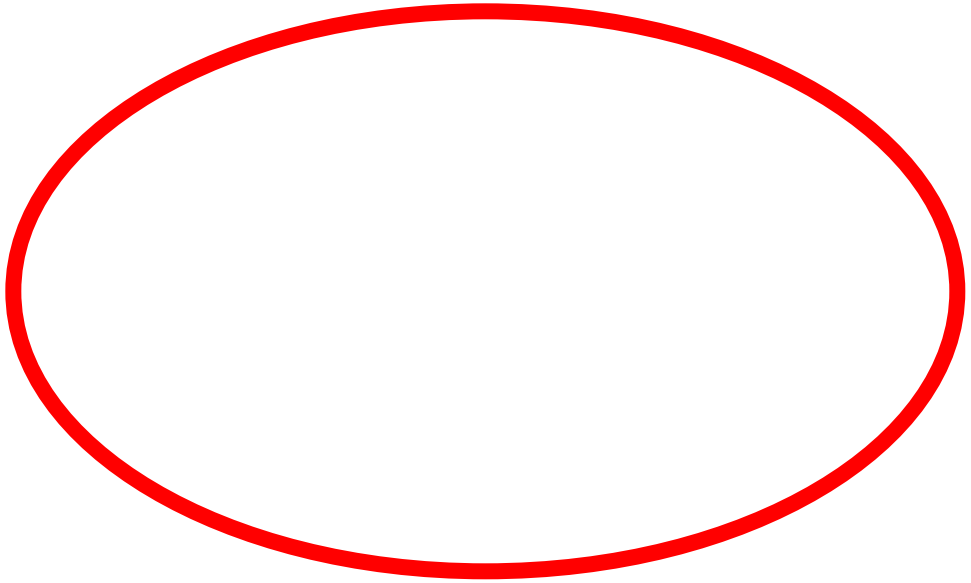

SpA are a group of rheumatic disorders that share several common factors:

1. Synovitis ***and*** enthesitis
2. Similar association with HLA-B27
3. Usually RF -ve

# Normal SI joints



# Ankylosis of SI joints



# Case 3

**37 y.o. ♀ nurse with 6 month hx of RF/CCP + RA on MTX 20mg po q week X 3 months with breakthrough sxs including arthralgia and synovitis. Has erosions on hands/wrists and feet x-rays.**

**PMH---s/p TAH/BSO**

**+ PPD X 5yrs, -CXR, no prior treatment**

**No other meds except MTX/Folic Acid**

# ARS question

**What is your recommendation for this 37 y.o. with RA?**

**a-add NSAID.**
**b-add low dose prednisone 7.5mg qam.**
**c-add hydroxychloroquine.**
**d-add biologic.**

# X-ray Changes in RA

# Goals of RA treatment

-Relieve pain

-Reduce inflammation

-Protect articular structures

-Maintain function

-Control systemic involvement

Ruderman, Eric M., MD, Editorial Consultant. Management of Rheumatic Diseases in the Biologic Era. Coalition of Rheumatology Educators; 2008

| HISTORY | Inflammatory Prototypical (RA) | Non-inflammatory Prototypical (OA) |
|---|---|---|
| SWET | +++ | + |
| AM stiffness | +++ | + |
| Aggravating Sxs | Rest | Activity |
| Alleviating Sxs | Activity | Rest |
| Extra-articular manifestations | +++ | - |
| EXAM | | |
| SWET | +++ | + |
| ROM | + | + |
| Extra-articular manifestations | +++ | - |

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ARTHRITIS AND RHEUMATISM
Vol. 31, No. 3, March 1988




# THE AMERICAN RHEUMATISM ASSOCIATION 1987 REVISED CRITERIA FOR THE CLASSIFICATION OF RHEUMATOID ARTHRITIS

FRANK C. ARNETT, STEVEN M. EDWORTHY, DANIEL A. BLOCH, DENNIS J. McSHANE, JAMES F. FRIES, NORMAN S. COOPER, LOUIS A. HEALEY, STEPHEN R. KAPLAN, MATTHEW H. LIANG, HARVINDER S. LUTHRA, THOMAS A. MEDSGER, Jr., DONALD M. MITCHELL, DAVID H. NEUSTADT, ROBERT S. PINALS, JANE G. SCHALLER, JOHN T. SHARP, RONALD L. WILDER, and GENE G. HUNDER

***Morning stiffness lasting at least 1 hour**
***Arthritis of three or more joint areas**
***Arthritis of hand joints**
***Symmetric arthritis**
***Rheumatoid nodules**
***Serum rheumatoid factor**
***Radiographic changes**

**4/7 criteria present (first four listed for at least 6 weeks)**

# 2010 ACR/EULAR
# Classification Criteria for RA

| JOINT DISTRIBUTION (0-5) | |
|---|---|
| 1 large joint | 0 |
| 2-10 large joints | 1 |
| 1-3 small joints (large joints not counted) | 2 |
| 4-10 small joints (large joints not counted) | 3 |
| >10 joints (at least one small joint) | 5 |
| **SEROLOGY (0-3)** | |
| Negative RF AND negative ACPA | 0 |
| Low positive RF OR low positive ACPA | 2 |
| High positive RF OR high positive ACPA | 3 |
| **SYMPTOM DURATION (0-1)** | |
| <6 weeks | 0 |
| ≥6 weeks | 1 |
| **ACUTE PHASE REACTANTS (0-1)** | |
| Normal CRP AND normal ESR | 0 |
| Abnormal CRP OR abnormal ESR | 1 |

**≥6 = definite RA**

What if the score is <6?

Patient might fulfill the criteria…

→ **Prospectively** over time (cumulatively)

→ **Retrospectively** if data on all four domains have been adequately recorded in the past

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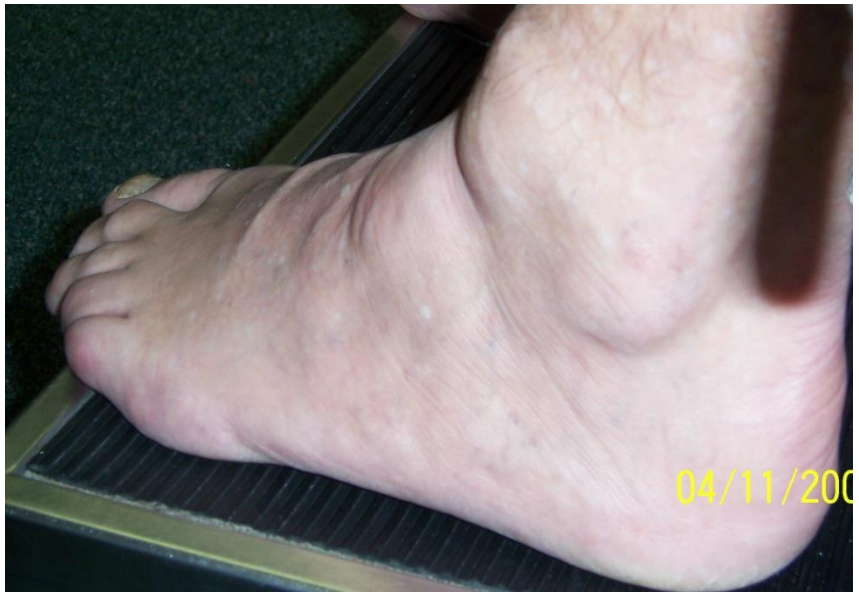
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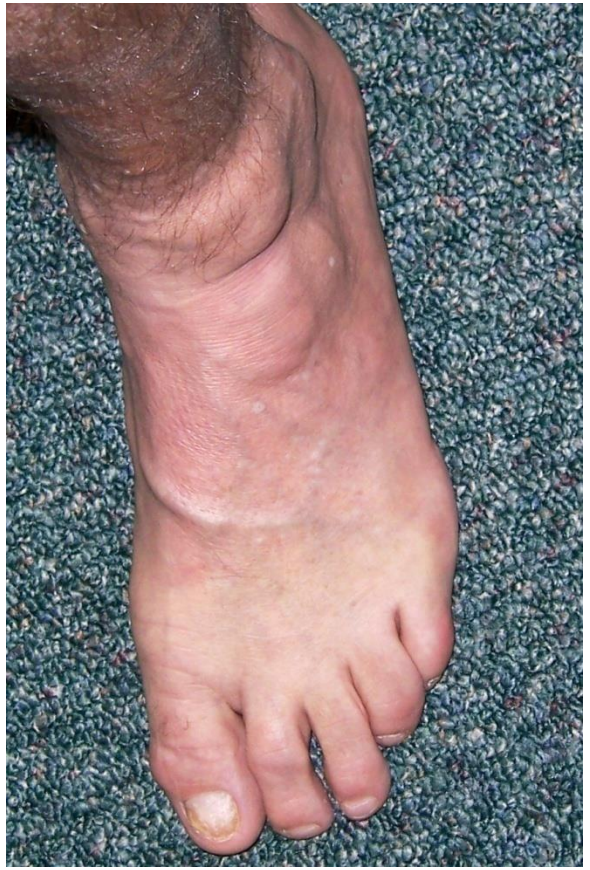


# EXTRA-ARTICULAR MANIFESTATIONS OF RHEUMATOID ARTHRITIS

| | |
|---|---|
| Skin | Nodules, fragility, vasculitis, pyoderma gangrenosum |
| Heart | Pericarditis, premature atherosclerosis, vasculitis, valve disease, and valve ring nodules |
| Lung | Pleural effusions, interstitial lung disease, bronchiolitis obliterans, rheumatoid nodules, vasculitis |
| Eye | Keratoconjunctivitis sicca, episcleritis, scleritis, scleromalacia perforans, peripheral ulcerative keratopathy |
| Neurologic | Entrapment neuropathy, cervical myelopathy, mononeuritis multiplex (vasculitis), peripheral neuropathy |
| Hematopoietic | Anemia, thrombocytosis, lymphadenopathy, Felty's syndrome |
| Kidney | Amyloidosis, vasculitis |
| Bone | Osteopenia |

RA, splenomegaly, and neutropenia. This complication is seen in patients with severe, RF/ACPA-positive disease and may be accompanied by hepatomegaly, thrombocytopenia, lymphadenopathy, and fevers

# Rheumatoid Nodules

# Rheumatoid Factor

- Autoantibodies directed against Fc portion of IgG (IgM to IgG)

- 75-90% of RA patients

- Result can help with diagnosis, but is not diagnostic of RA

- RF not used to measure RA disease activity, but higher titers can be associated with disease severity, erosions, extra-articular manifestations, disability

# Anti-Cyclic Citrullinated Peptide Antibodies (anti-CCP)

- RA sensitivity 47-76%
  specificity 90-96%

- Can occur in active TB, SLE, Sjogren's, Polymyositis, Dermatomyositis, Scleroderma

- (+) CCP Ab
  more likely to have aggressive disease and progressive radiographic joint damage

# Radiographic Studies

X-rays

Ultrasound

Magnetic Resonance Imaging

# Dr. F. Dudley Hart's ABCs of RA cures

A-accupunture, apple diet, auto-haemotheropathy, angora wool

B-bee venom, copper bangles, various baths

C-chemotherapy, copper salts, crows' meat, cobalt

D-doca and ascorbic acid, diet

E-extractions of teeth and other septic foci, ECT

F-fasting, fever, faith, fango

G-gin, guaiacum, gelatine, green-lipped mussel

H-heat, honey, hope, hypnotism, hayseed

I-insulin, iodine, inner cleanliness

J-induction of jaundice

K-vitamin K, kaolin compresses

L-Lourdes, love

M-mud, magnetism, moxibustion, mistletoe

N-nutmeg, nettles

O-oral and intra-articular olive and other oils

P-placenta extracts, prayer, procaine, polyvinyl clothing

Q-quinine substitutes

R-rhubarb, rest

S-speransky's pump, sulphur, spa therapy, seaweed

T-fresh or pregnant transfusions of blood, tiger balm

U-ultrasonics, anti-rheumatic underwear, urea

V-vitamins, vertebral manipulations, vaccines

W-standing inside a whale, earthworms, water

X-Xmas snow

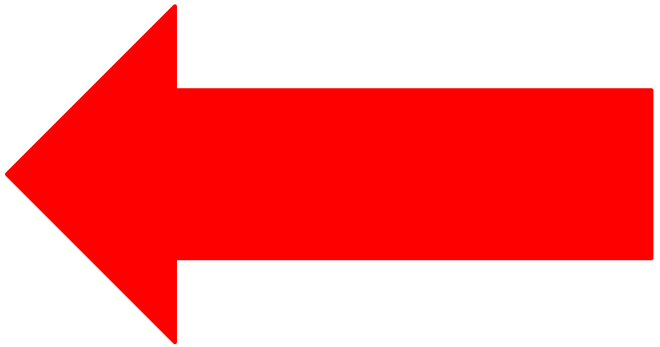
Y-Yoghurt, yoga

Z-zam-buk, zyloric (allopurinol)

Hart FD. History of the Treatment of RA. *British Medical Journal.* 1976; 1: 763-5.

# Pharmacologic Therapy

- Nonsteroidal Anti-inflammatory Drugs
- Corticosteroids
- Hydroxychloroquine
- Sulfasalazine
- Methotrexate
- Leflunomide
- Azathioprine
- Cyclosporine



Disease modifying antirheumatic drugs (DMARDs)

# Guidelines for use of glucocorticoids in RA

-Avoid use of glucocorticoids without DMARDs

-Prednisone, >10 mg/day, is rarely indicated for articular disease

-Taper to the lowest effective dose

-Use as “bridge therapy” until DMARD therapy is effective

-Remember prophylaxis against osteoporosis

# Biologics/Small Molecules

-Tumor Necrosis Factor-ά antagonists

Adalimumab (Humira)-SQ

Certolizumab (Cimzia)-SQ

Etanercept (Enbrel)-SQ

Golimumab (Simponi, Simponi Aria)-SQ, IV

Infliximab (Remicade)-IV

-Interleukin-1 receptor antagonist (IL-1)

Anakinra (Kineret)-SQ

-B cells

Rituximab (Rituxan)-IV

-T cells

Abatacept (Orencia)-SQ, IV

-Interleukin-6 receptor (IL-6R)

Tocilizumab (Actemra) SQ, IV

Sarilumab (Kevzara)-SQ

-Janus Kinase (JAK) inhibitor

Tofacitinib (Xeljanz)-PO

Baricitinib (Olumiant)-PO

Upadacitinib (Rinvoq)-PO

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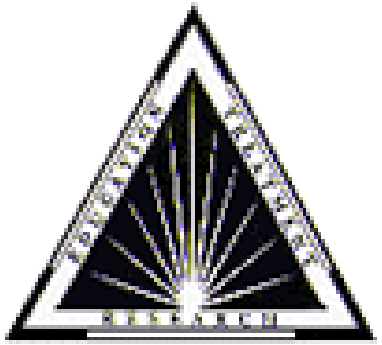

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-Don't test ANA sub-serologies without a positive ANA and clinical suspicion of immune-mediated disease.

-Don't test for Lyme disease as a cause of musculoskeletal symptoms without an exposure history and appropriate exam findings.

-Don't perform MRI of the peripheral joints to routinely monitor inflammatory arthritis.

- Don't prescribe biologics for rheumatoid arthritis before a trial of methotrexate (or other conventional non-biologic DMARDs).

-Don't routinely repeat DXA scans more often than once every two years.

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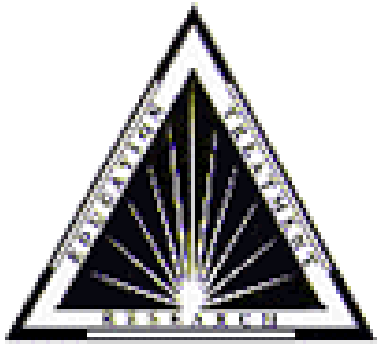

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# Biologics/Small Molecules

Potential risks

- Injection site/infusion reaction
- Infection risk (bacterial, TB/other granulomatous, opportunistic)
- Malignancy risk ?
- Demyelinating Disease, MS or Family Hx
- Heart failure
- Drug induced syndromes (ANA, dsDNA)
- Cytopenias
- Gastrointestinal perforation

# My Pre-Drug Questions

-Current/recurrent infxns

-Cancer (CA)

-Congestive Heart Failure (CHF)

-Chronic Obstructive Pulmonary Disease (COPD)/asthma

-Tuberculosis (TB)

  *PPD hx

  *exposure

-Multiple Sclerosis (MS)

-Hepatitis B/C

-Hyperlipidemia

# Biologics/Small Molecules

## Pre-drug screening

-CXR

-PPD/Interferon-gamma release assays (IGRAs)

-Pneumonia vaccine

-Influenza vaccine

-COVID vaccines

-Hepatitis B and C  serologies

# 2022 American College of Rheumatology (ACR) Guideline for Exercise, Rehabilitation, Diet, and Additional Integrative Interventions for Rheumatoid

- First ACR guideline for integrative interventions for RA management
- Strong recommendation for consistent exercise
- Conditional recommendations for specific exercise types, comprehensive PT/OT, several rehabilitation modalities, Mediterranean-style diet, and several additional integrative interventions
- Interprofessional teams are critical for guiding patients through their disease course
- Access to, and burden of, these interventions expected to impact patient engagement and/or adoption
- Conditional nature of most recommendations requires engaging patients in shared decision making and highlights the need for additional research

# When to Refer

**Uncertain diagnosis**

**Confusing Lab Results**

**Uncomfortable with DMARDS or Biologic Use**

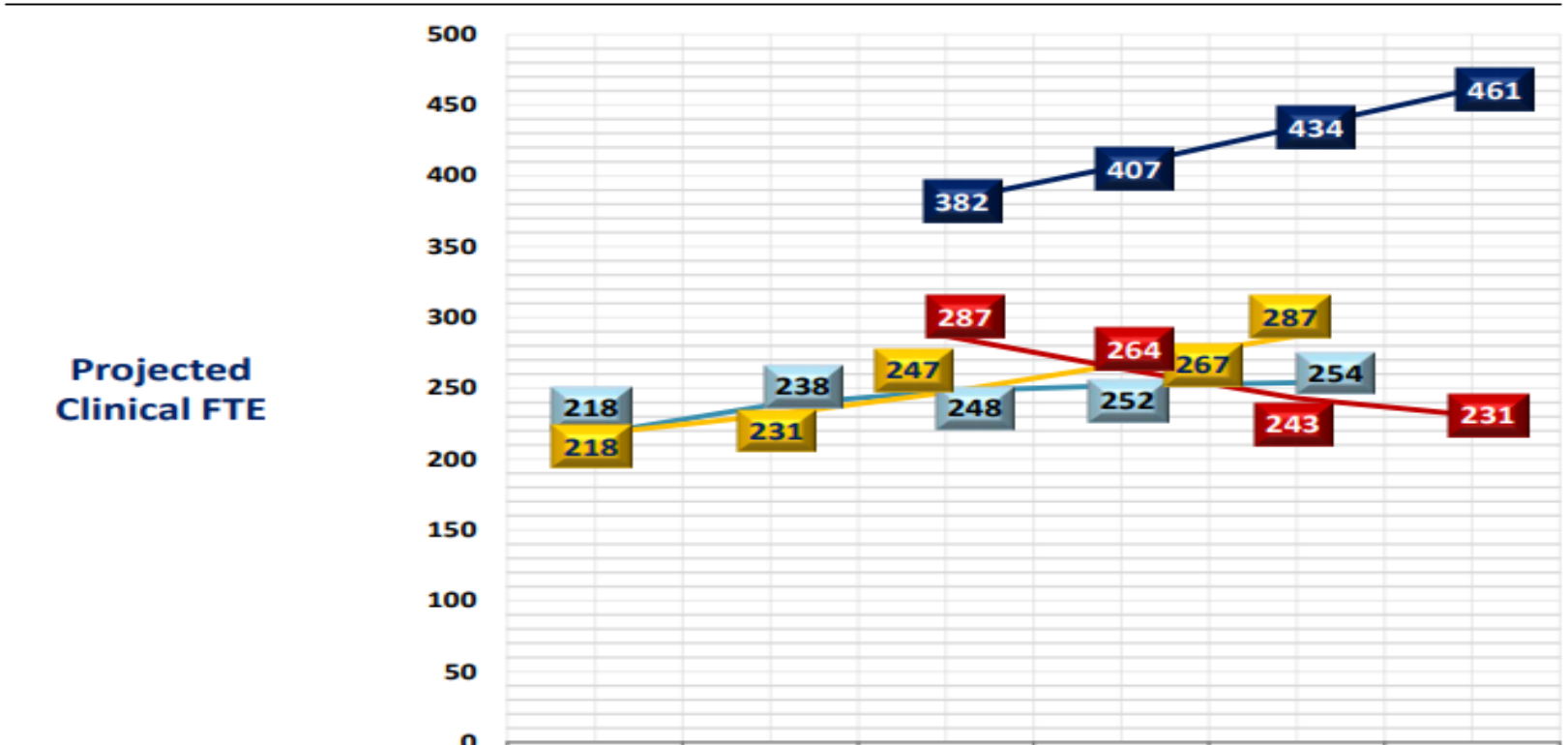
**Patient not responding**

**Erosions or other radiographic changes**

**Side effects**


Figure 2. Comparison of Projected Supply and Demand of Adult Rheumatology Workforce

2015 Workforce Study of Rheumatology Specialists in the United States: Final Report
http://www.rheumatology.org/portals/0/files/ACR-Workforce-Study-2015.pdf




| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| 2005 Projected Supply | 218 | 238 | 248 | 252 | 254 | |
| 2005 Projected Demand | 218 | 231 | 247 | 267 | 287 | |
| 2015 Projected Supply | | | 287 | 264 | 243 | 231 |
| 2015 Projected Demand | | | 382 | 407 | 434 | 461 |

Figure E-7. Comparison of Projected Supply and Projected Demand of Pediatric Rheumatologists

Note. Data from 2005 workforce study (2005 to 2025); Data from the 2015 workforce study (2015 to 2030).

2015 Workforce Study of Rheumatology Specialists in the United States: Final Report
http://www.rheumatology.org/portals/0/files/ACR-Workforce-Study-2015.pdf

# Question 1

**1. Extra-articular manifestations are associated with the following types of arthritis except:**

a. Ankylosing Spondylitis
b. Gout
c. Osteoarthritis
d. Rheumatoid arthritis

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# Question 2

2. **Gout is definitely diagnosed by:**

**a. noting an elevated serum uric acid on laboratory.**

**b. detecting strongly negative birefringent crystals using polarized light microscopy.**

**c. detecting weakly positive birefringent crystals using polarized light microscopy.**

**d. detecting calcium pyrophosphate crystals using polarized light microscopy.**

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# Question 3

**3. Which of the following screening tests is recommended prior to starting a biologic medication for the treatment of rheumatic disease?**

a. Computed tomography of the small joints of the hands

b. Hemoglobin A1C

c. Magnetic resonance imaging of the lungs

d. Tuberculosis screening, ppd or IGRA

# Question 3

**3. Which of the following screening tests is recommended prior to starting a biologic medication for the treatment of rheumatic disease?**

a. Computed tomography of the small joints of the hands

b. Hemoglobin A1C

c. Magnetic resonance imaging of the lungs

d. Tuberculosis screening, ppd or IGRA

# Lessons for Practice

-A systematic approach is required when a patient presents with arthralgia, including the need to obtain a comprehensive history, a through review of systems, and an appropriate physical exam.

-Rheumatic diseases cause arthralgia, but many are also systemic conditions. Consider how rheumatic disease can affect on other organ systems besides joints.

-When considering rheumatoid arthritis in a differential diagnosis, order both a rheumatoid factor (RF) and Anti-Cyclic Citrullinated Peptide when indicated.

-There are numerous options for treating inflammatory arthritis in 2023.

# References


-West SG, Kolfenback J, eds. Rheumatology Secrets. 4th ed. Philadelphia, Penn. Elsevier; 2020.

-Kolasinski SL, et al. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip and Knee. *Arthritis Care Res.* 2020; 72(2); 149-162.

-Aletaha D, et al. 2010 Rheumatoid Arthritis Classification Criteria: An American College of Rheumatology/European League Against Rheumatism Collaborative Initiative. *Arthritis Rheum* 2010; 62; 2569-81.

-Fraenkel L, et al. 2021 American College of Rheumatology Guideline for the Treatment of Rheumatoid Arthritis. Arthritis Rheum. 2021; 73(7): 1108-1123.

-England BR, Smith BJ, et al. 2022 American College of Rheumatology (ACR) Guideline for Exercise, Rehabilitation, Diet, and Additional Integrative Interventions for Rheumatoid Arthritis. Arthritis Care Res. 2023; in review.

-Ward MM, et al. 2019 Update of the American College of Rheumatology/Spondylitis Association of America/Spondylarthritis Research and Treatment Network Recommendations for the Treatment of Ankylosing Spondylitis and Nonradiographic Axial Spondylarthritis. Arth Rheumatol. 2019; 71(10): 1599-1613.

-Fitzgerald JD, et al. 2020 American College of Rheumatology Guideline for the Management of Gout. Arthritis Care Res. 2020; 72(6): 744-760.