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ARIZONA
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PROGRAM

Improving Access to Quality Medical Care Webinar Series

Presented by

Southwest Telehealth Resource Center
and the University of Arizona's
Center for Rural Health

Welcome

AZ, UT, CO, NM & NV FLEX Programs

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The **University of Arizona Center for Rural Health & the Southwest Telehealth Resource Center** welcomes you to this free webinar on the implementation & practice of telemedicine. The practice & deliver of healthcare is changing, with an emphasis on **improving quality, safety, efficiency, & access to care.**

Telemedicine can help you achieve these goals!

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- Mute your phone &/or computer microphone
- Time is reserved at the end for Q&A
- Please fill out the post-webinar survey
- Webinar is being recorded
- Recordings will be posted on the SWTRC & CRH websites

<http://www.southwesttrc.org>

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Telerheumatology promise and problems in the twenty-first Century



Jeffrey R Lisse, MD

Medical Director

Arizona Telemedicine Program

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Tele-Rheumatology

Jeffrey R. Lisse, M.D.

Ethel P. McChesney Bilby Professor of Medicine
Medical Director, Arizona Telemedicine Program
University of Arizona Arthritis Center

Discipline of Rheumatology

- Encompasses medical aspects of the musculoskeletal system
- Includes autoimmune disorders, mechanical and degenerative diseases, and metabolic bone problems
- Over 100 different causes for arthritis
- Most of the patients present with pain
- Osteoporosis, silent disease until fractures occur

Rheumatology Manpower

- Nationwide shortage of rheumatologists
- Average age of practitioners 58 years
- Many rural areas are without any rheumatologist

Arthritis Facts

- 2/3 of people with arthritis are <65 y/o
- 300,000 children affected
- 50 million Americans with arthritis
- Osteoarthritis is the most common form
- Rheumatoid arthritis is the most common inflammatory arthritis
- Accounts for 44 million outpatient visits
- 992,100 hospitalizations

Arthritis Foundation website 2014

Arthritis Facts

- Leading cause of disability in US
- Most common cause of activity limitations
- By 2030, 67 million Americans affected

Arthritis Foundation Website 2014

Arthritis - Rheumatic Disease

Over 100 Different Kinds

Rheumatoid Arthritis
Degenerative (Osteoarthritis)
Ankylosing Spondylitis
Psoriatic Arthritis
Reiter's Syndrome
SLE
Polyarteritis
Scleroderma (PSS)
Polymyositis
Dermatomyositis
Fibrositis
Disc and Low Back Syndrome
Sarcoidosis
Relapsing Polychondritis
GI Arthropathy
Amyloidosis
Septic Arthritis

SBE
Viral Arthritis
(Hepatitis etc.)
AIDS and Arthritis
TB, Fungal Arthritis
Traumatic Arthritis
Gout
Pseudogout (CPPD)
Shoulder Hand
Syndrome
Ochronosis
Tendinitis, Bursitis
Hemophilic Arthritis
Hemoglobinopathy
Gaucher's Disease
Acromegaly
Thyroid Arthropathy

Tumor and Arthritis
Serum Sickness
Marfan's
Ehlers Danlos
Congenital Hip Dislocation
Avascular Necrosis
Hypertrophic
Osteoarthropathy
Osteochondritis Dessicans
Osteoporosis
Osteomalacia
Tietze's Syndrome
Hemochromatosis
Behcet's Syndrome
Weber Christian
Hydroxyapatite Disease
Charcot Arthropathy

Unmet Needs

- Shortage of Trained Rheumatologists
- Mal-distribution of Rheumatologists to Urban Areas
- Difficulty Training Ancillary Personnel in Rheumatology
- Reimbursement



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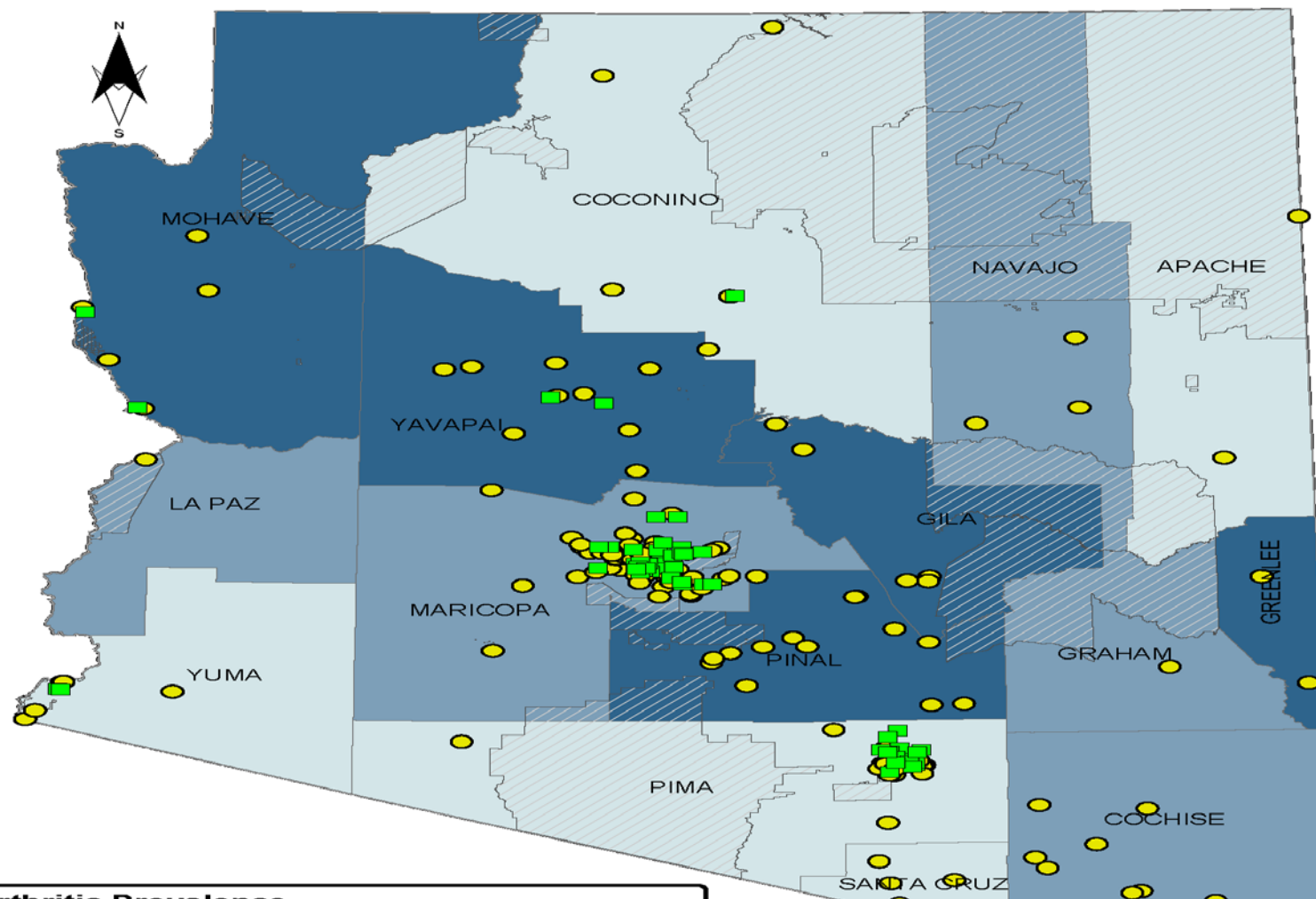
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Arizona Arthritis Prevalence by County, 2001 to 2005



Arthritis Prevalence

15.1% - 25.1%

25.2% - 30%

30.1% - 37.3%

Rheumatologists2

Senior_Centers

American Indian Reservations

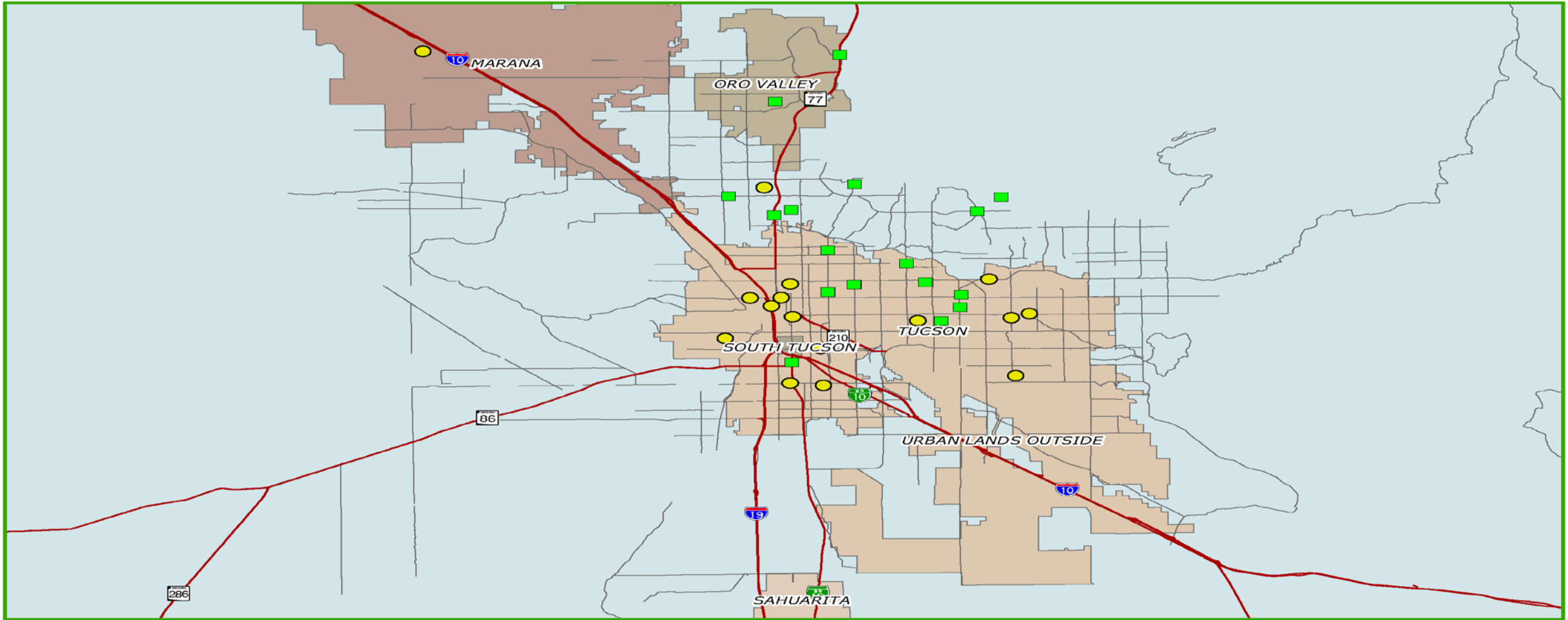
0 15 30 60 90 120 Miles

Source Data: Arizona BRFSS 01-05,
Rheumatology.org and ArizonaSeniors.net



Map Date:
February 2008

Metro Tucson Rheumatologists and Senior Centers



0 4 8 12 16 Miles

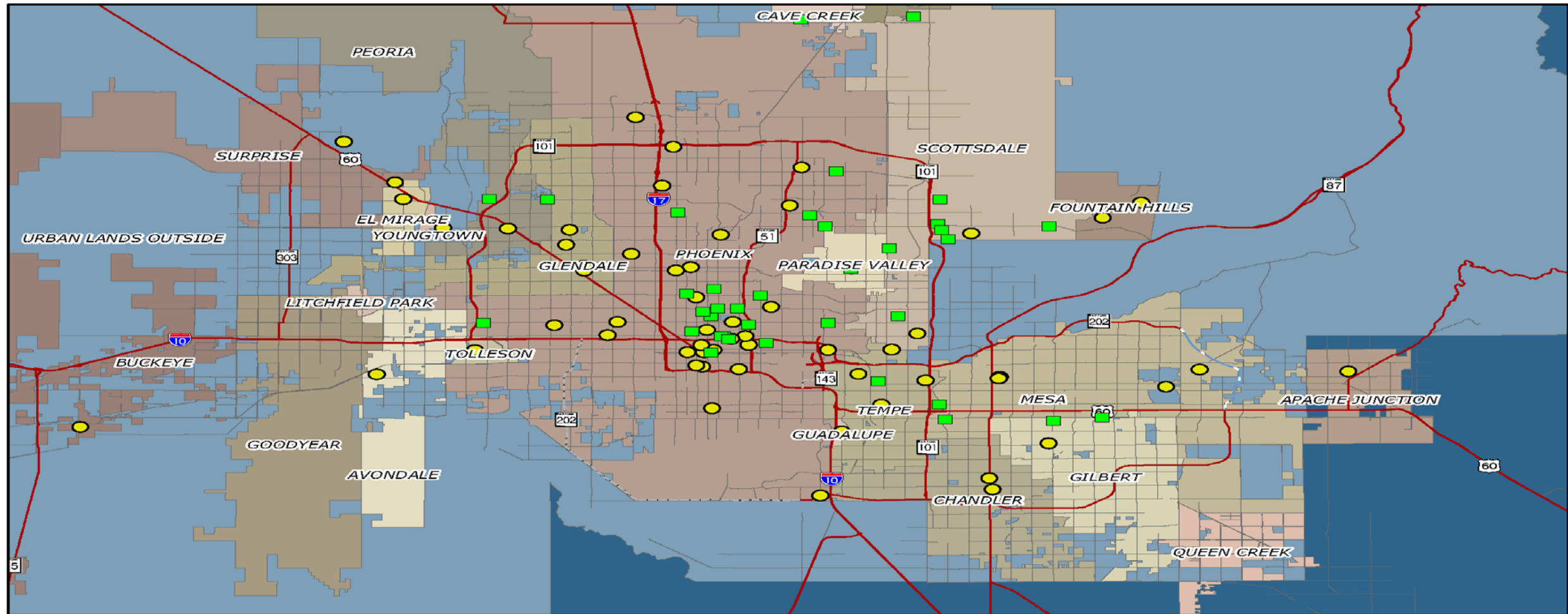
■ Rheumatologists ● Senior Centers

Source Data: Arizona BRFSS 01-05, Rheumatology.org and ArizonaSeniors.net



Map Date:
February 2008

Metro Phoenix Rheumatologists and Senior Centers



0 5 10 15 20 Miles

■ Rheumatologists ● Senior Centers

Source Data: Arizona BRFSS 01-05, Rheumatology.org and ArizonaSeniors.net



Map Date:
February 2008

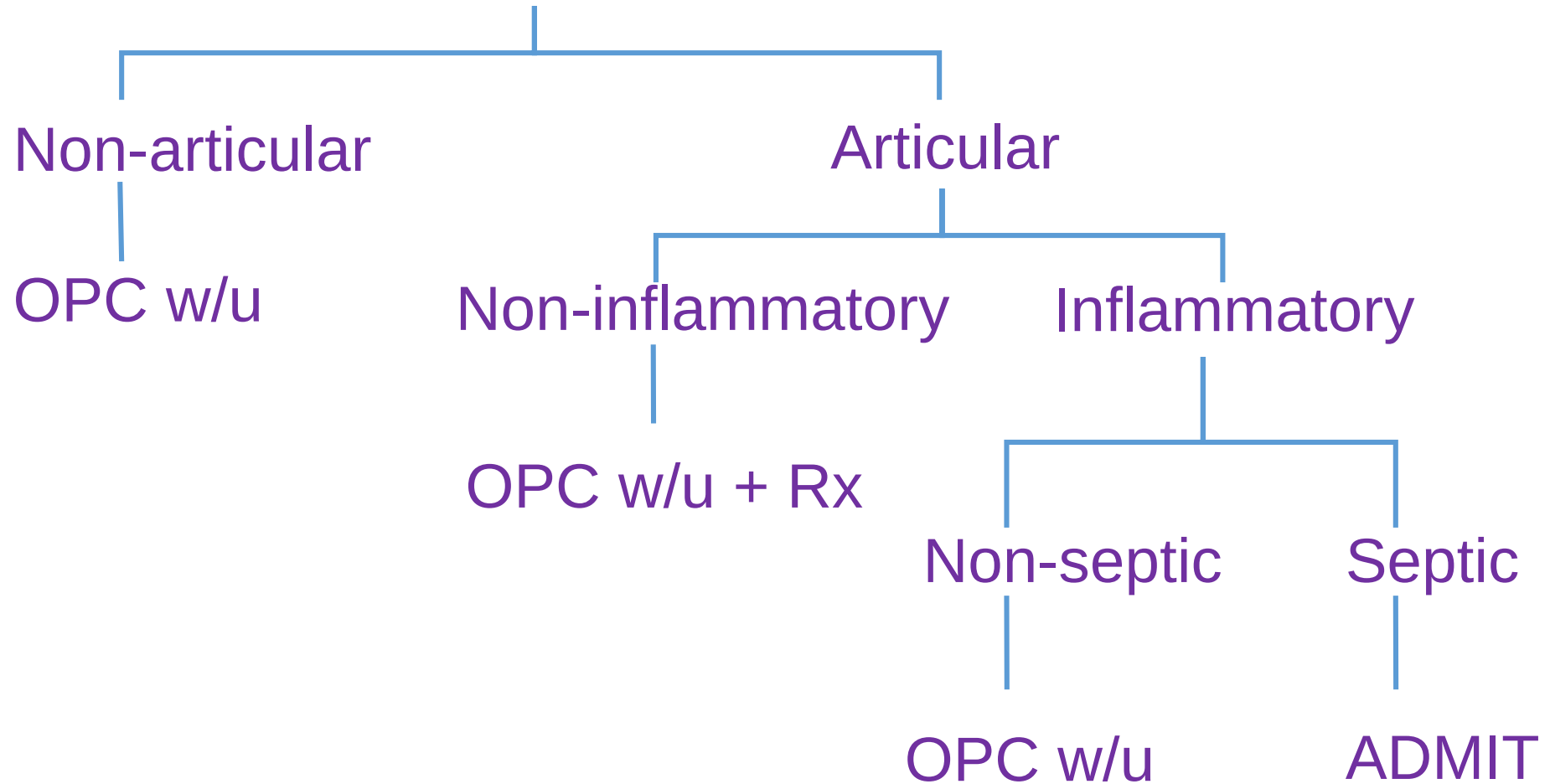
Challenges for Telerheumatology

- Tactile portion of physical examination
- Tenderness
- Warmth
- Swelling
- Painful range of motion
- Training and Experience

**Synovium attaches
to joint margin**



Pain In or Near Joint



Causes of Shoulder Pain

Extrinsic

Neurovascular Compression

Cervical Spine

Reflex Dystrophy

CNS – other Neurologic

Visceral

Gallbladder/Spleen

Bowel

Cardiac

Pleural

Drugs

INH, Phenobarbital

Intrinsic

Arthritis

Inflammatory

Non Inflammatory

Bursitis (subdeltoid)

Tendinitis (Biceps etc.)

Rotator Cuff

Adhesive Capsulitis

Muscle

Trauma (Fracture, Sublux)

Tumor

Infection

History

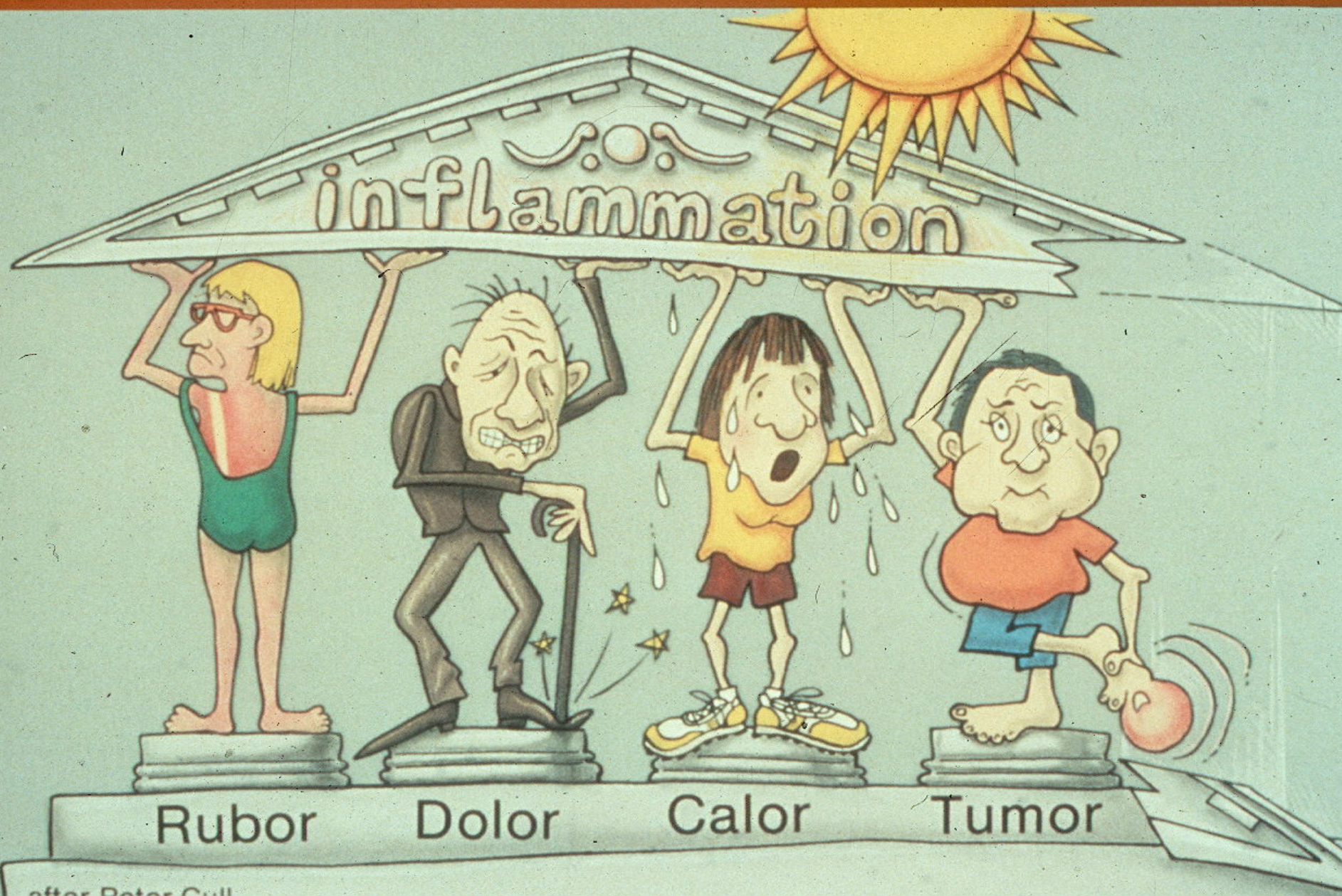
- Onset
- Aggravators, relievers
- Character
- Temporal factors
 - Pain
 - Swelling, erythema
 - Stiffness (time of day, how long?)
 - Mobility
 - Function
 - Deformity
- Family history
- Review of systems
- Patient & family history
- Review of systems

Arthritis Progression

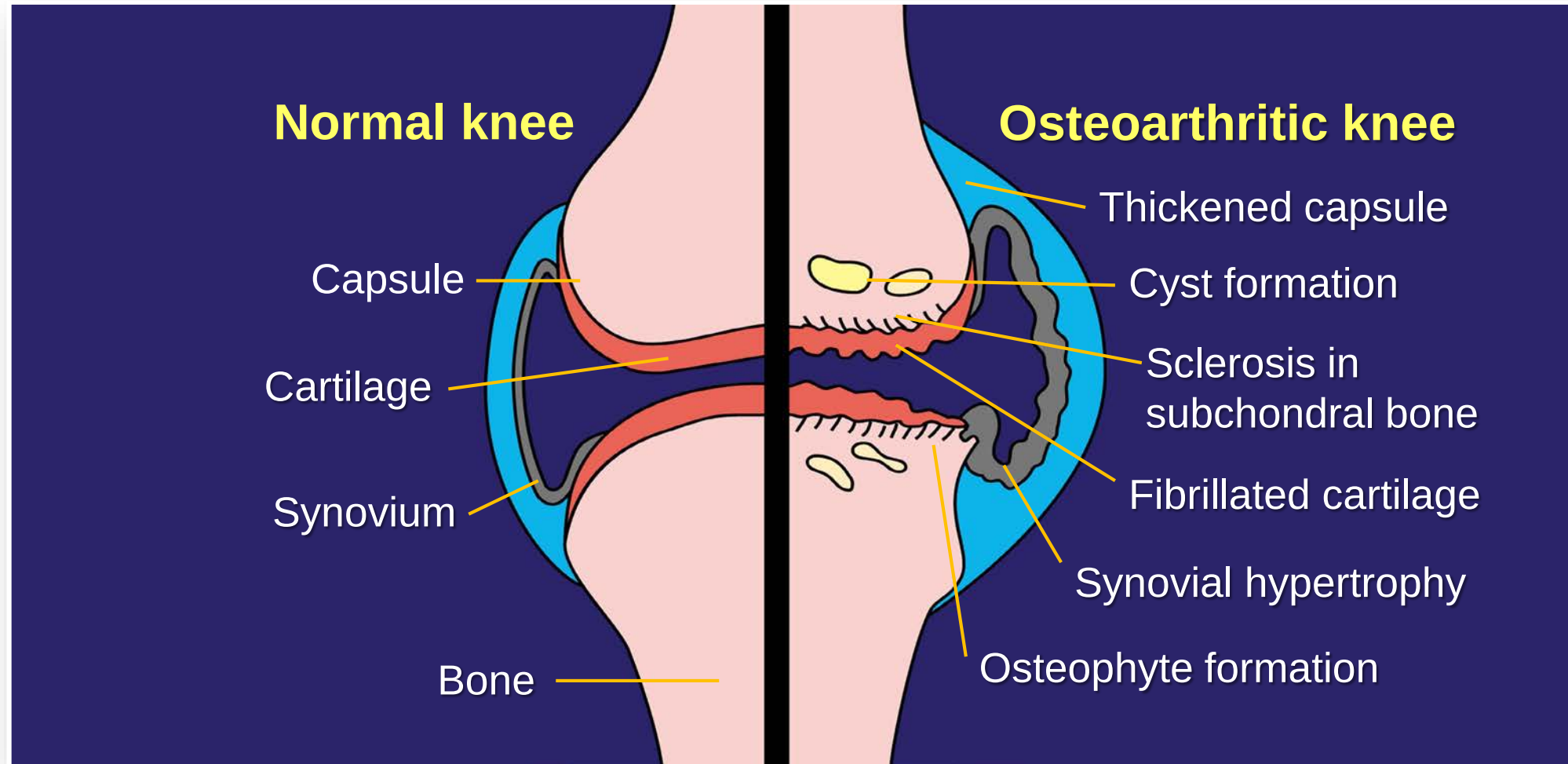
Intermittent	Migratory	Additive
Intermittent Hydrarthrosis	Gonococcal Arthritis	Rheumatoid Arthritis
Palindromic Rheumatism	Rheumatic Fever	Osteoarthritis
Gout	Early Gout	Spondyloarthropathies
Pseudogout		JRA - Polyarticular
Reactive Arthritis		
Behçet's Syndrome		
SLE		
Still's Disease		

Physical Examination

- Vital signs
- Skin rash/ulcers/livedo
- Nail changes
- Clubbing
- Nodules/tophi
- Conjunctival injection
- Mouth ulcers
- Chest expansion
- Heart murmur
- Temporal artery
- Hepato-splenomegaly
- Urethral discharge
- Muscle tenderness/weakness
- Neurologic



Normal vs OA Joint



Systemic Involvement RA and Other Rheumatic Illness

- Lymphadenopathy
 - Reactive
 - Kidney
 - Amyloid
 - Muscle
 - Wasting
 - Nervous System
 - Peripheral
 - Mononeuritis Multiplex
 - Compression Neuropathy
 - Skin
 - Nodules
 - Atrophy
 - Anemia
 - Constitutional
- Eye
 - Scleritis
 - Sicca
 - Lung
 - Pleural Effusion
 - Fibrosis
 - Nodules
 - Heart
 - Pericarditis
 - CAD
 - Splenomegaly – Felty's
 - GI
 - Ulcer
 - Amyloid
 - Vasculitis

Psoriatic Arthritis: Nail Deformities



Soft Tissue Rheumatism

1. Shoulder

Rotator cuff (supraspinatus) tendinitis bicipital tendinitis

2. Elbow

Lateral epicondylitis (tennis elbow)

Medial epicondylitis (golfer's elbow)

3. Hand

Trigger finger

Stenosing tenosynovitis of the long thumb abductor and short thumb extensor (DeQuervain's disease)

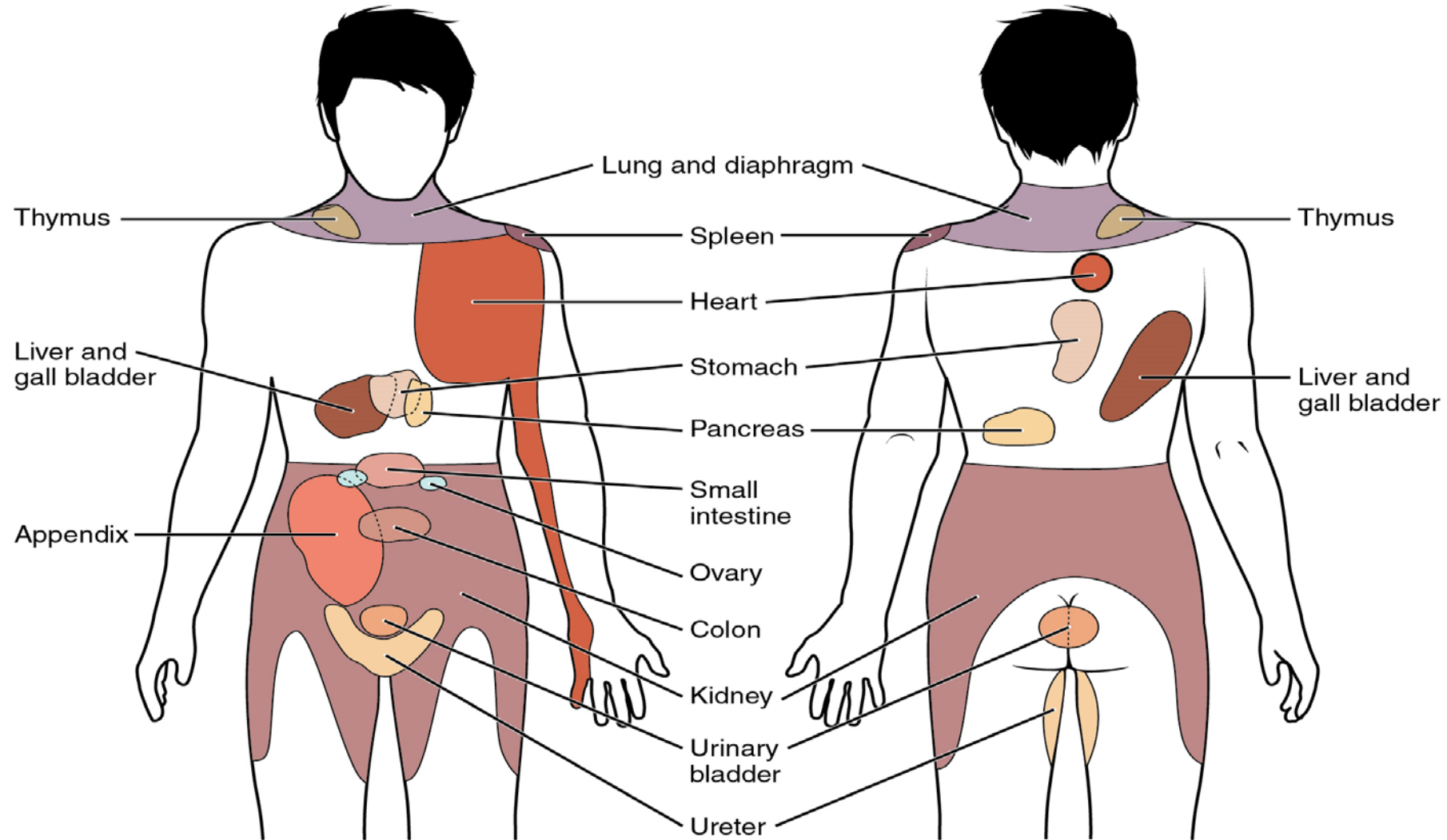
4. Hip

Trochanteric bursitis

5. Knee

Anserine bursitis

Sites of Referred Pain



The Musculoskeletal Examination

- Inspection
- Palpation and landmark identification
- Assessment of range of motion (ROM)
 - Active ROM
 - Passive ROM
- Special maneuvers, e.g.
 - Joint laxity
 - Nerve percussion
 - Spinal measurements
- Function

Feet are frequently the first complaint of patients with arthritis



Palpation

- Crepitation
- Clicks and crunches
- Warmth
 - Compare with opposite side or site away from joint
- Soft and/or hard tissue swelling
- Effusion
 - Bulge sign
- Tenderness



Function and deformity don't always match

Outcome Measures

- Tender joints
- Swollen joints
- Morning stiffness
- Time of onset of fatigue
- Grip strength
- Extra-articular features (i.e., subcutaneous nodules)
- Physician Global Index
- Patient Global Index
- Functional Index (i.e., Health Assessment Questionnaire – HAQ)
- LAB

Stanford Health Assessment Questionnaire (HAQ) Categories

Dressing and Grooming

- Dress yourself, including shoelaces and buttons?
- Shampoo your hair?

Arising

- Stand up from a straight chair?
- Get in and out of bed?

Eating

- Cut your meat?
- Lift a full cup or glass to your mouth?
- Open a new milk carton?

Walking

- Walk outdoors on flat ground?
- Climb up 5 steps?

Hygiene

- Wash and dry your body?
- Take a tub bath?
- Get on and off the toilet?

Reach

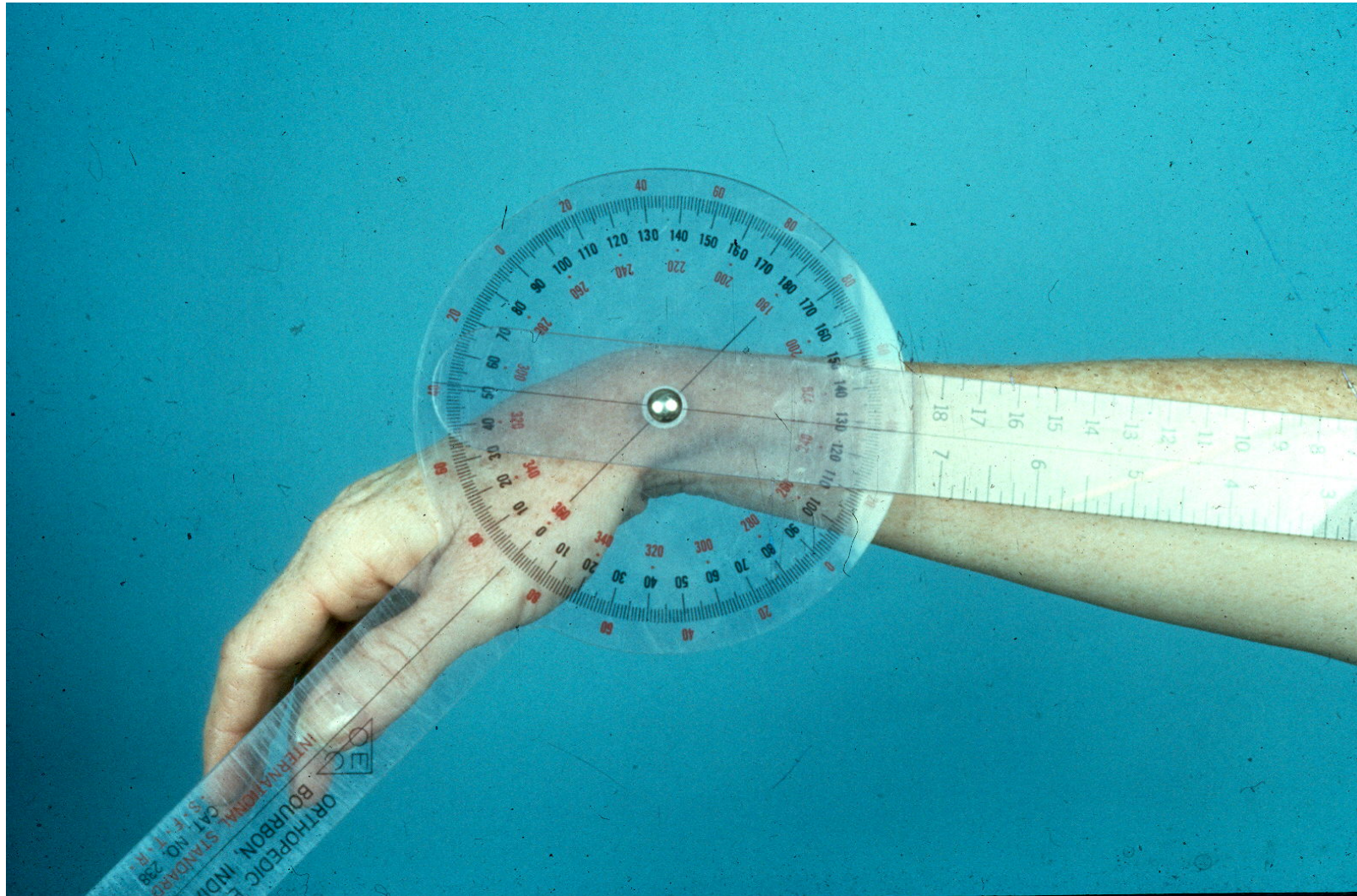
- Reach and get a 5-pound object (e.g., a bag of sugar)?
- Bend down to pick up clothing from the floor?

Grip

- Open car doors?
- Open jars which have been previously opened?
- Turn faucets on and off?

Activities

- Run errands and shop?
- Get in and out of a car?
- Do chores such as vacuuming or yard work?

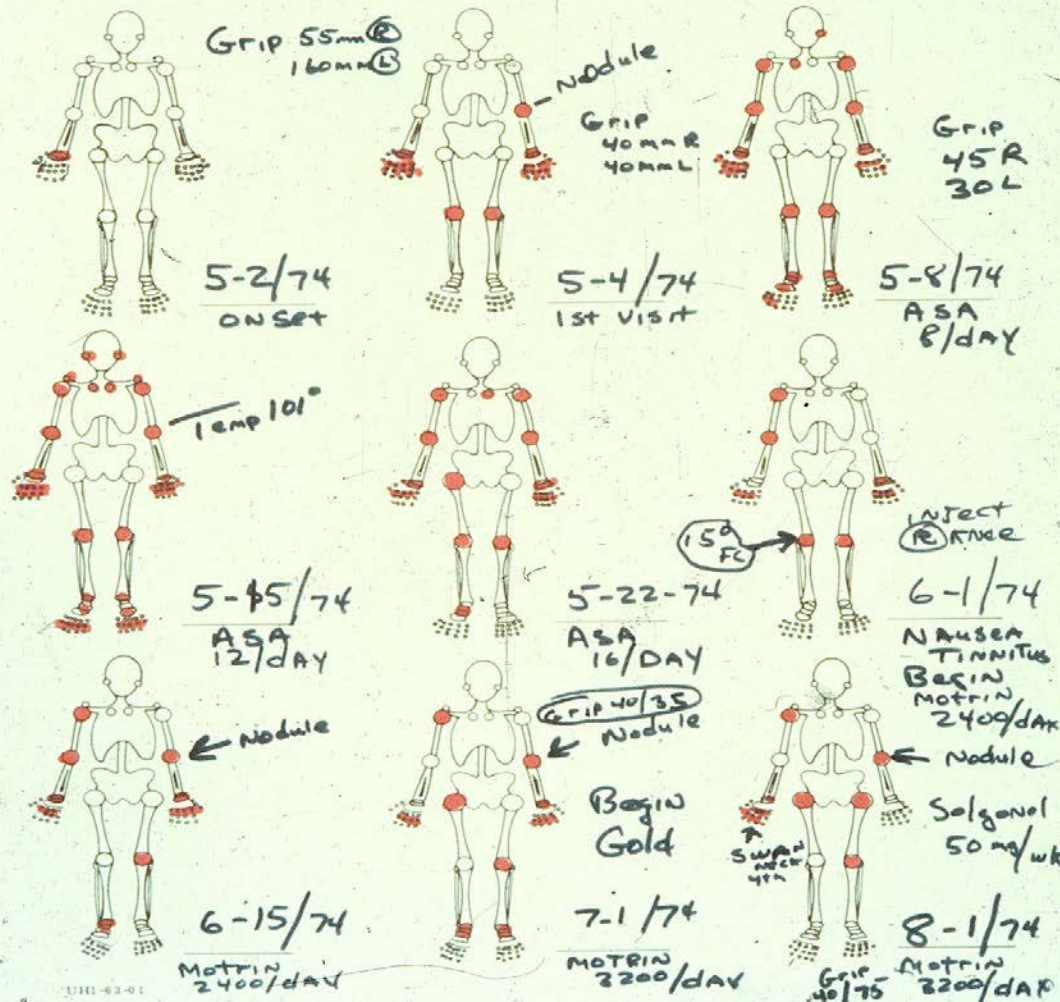


Goniometer to Measure Joint ROM

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JOINT EVALUATION
GRAPHIC SERIAL JOINT FIGURES

60PC
LOCATION: _____ DATE: _____
John Doe
PATIENT NAME
000-000-00
PATIENT NUMBER

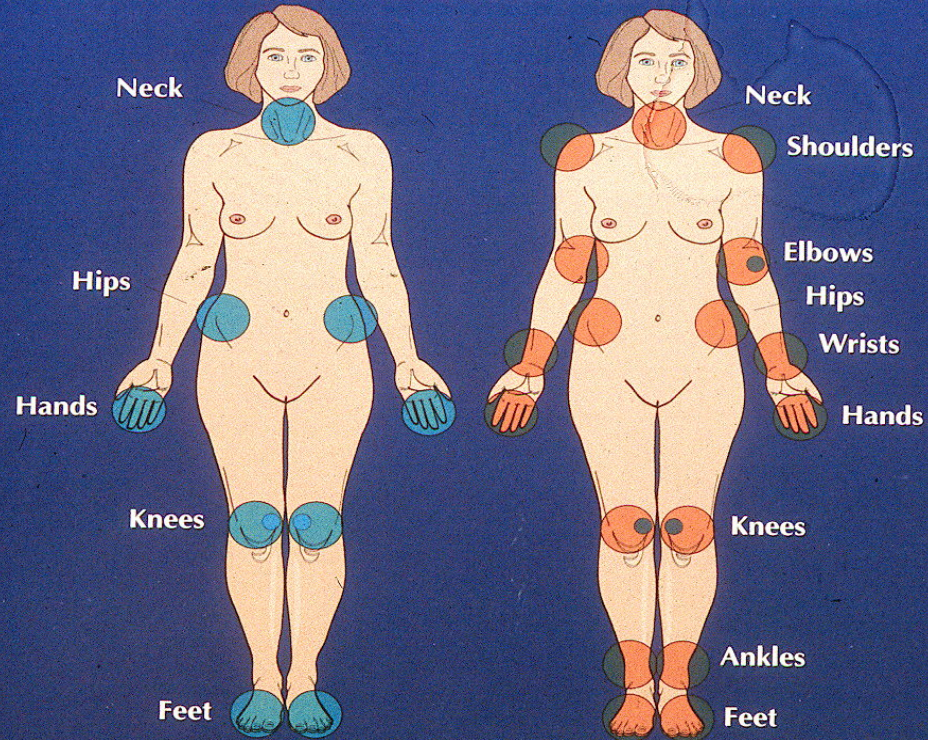


Use simple
diagram
to follow
progression
and Rx

Figure 1

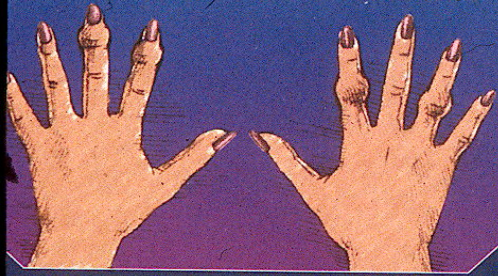
**Joints Usually Affected
by Osteoarthritis**

**Joints Usually Affected
by Rheumatoid Arthritis**



HEBERDEN'S NODES
Swelling may occur in this
joint of any finger

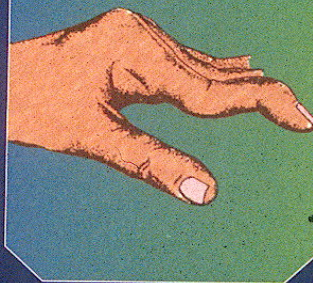
BOUCHARD'S NODES
Swelling may occur in this
joint of any finger



**Nodal Generalized Osteoarthritis
(menopausal osteoarthritis)**

The first symptoms of menopausal osteoarthritis are multiple swellings of the hands. The painful, bony knobby spurs (growths) at the end joints are called Heberden's nodes; those in the middle of the fingers are Bouchard's nodes.

Swan Neck Deformity



Ulnar Drift



Rheumatoid Arthritis Effects

The effects of rheumatoid arthritis on the hand are largely due to damage or displacement of the tendons. Common signs are tendon nodularity (swelling) and ulnar deviation of the fingers, the sideways rotation of the hand at the wrist. "Swan neck" and "boutonniere" are two types of deformities caused by hyperextension of the finger joints.

Illustrations adapted from Arthritis Foundation, Atlanta, GA and Figgie MP, Benzala D. *The Well-Informed Patient's Guide to Arthritis Surgery*, 1993, New York: Dell.

Pattern Recognition

MONOARTICULAR ARTHRITIS

Septic Arthritis

Pyogenic

Tuberculosis

Fungal

Crystal Arthritis

Gout

Pseudogout

Hydroxyapatite

Neoplasm

Benign

Malignant

Traumatic

Mechanical Derangement

Degenerative

**Bleeding Disorder
(Hemophilia)**

Juvenile Rheumatoid Arthritis

**Early Adult Rheumatoid
Arthritis**

**or Other Inflammatory
Arthritis**

Aseptic Necrosis

Intermittent Hydrarthrosis

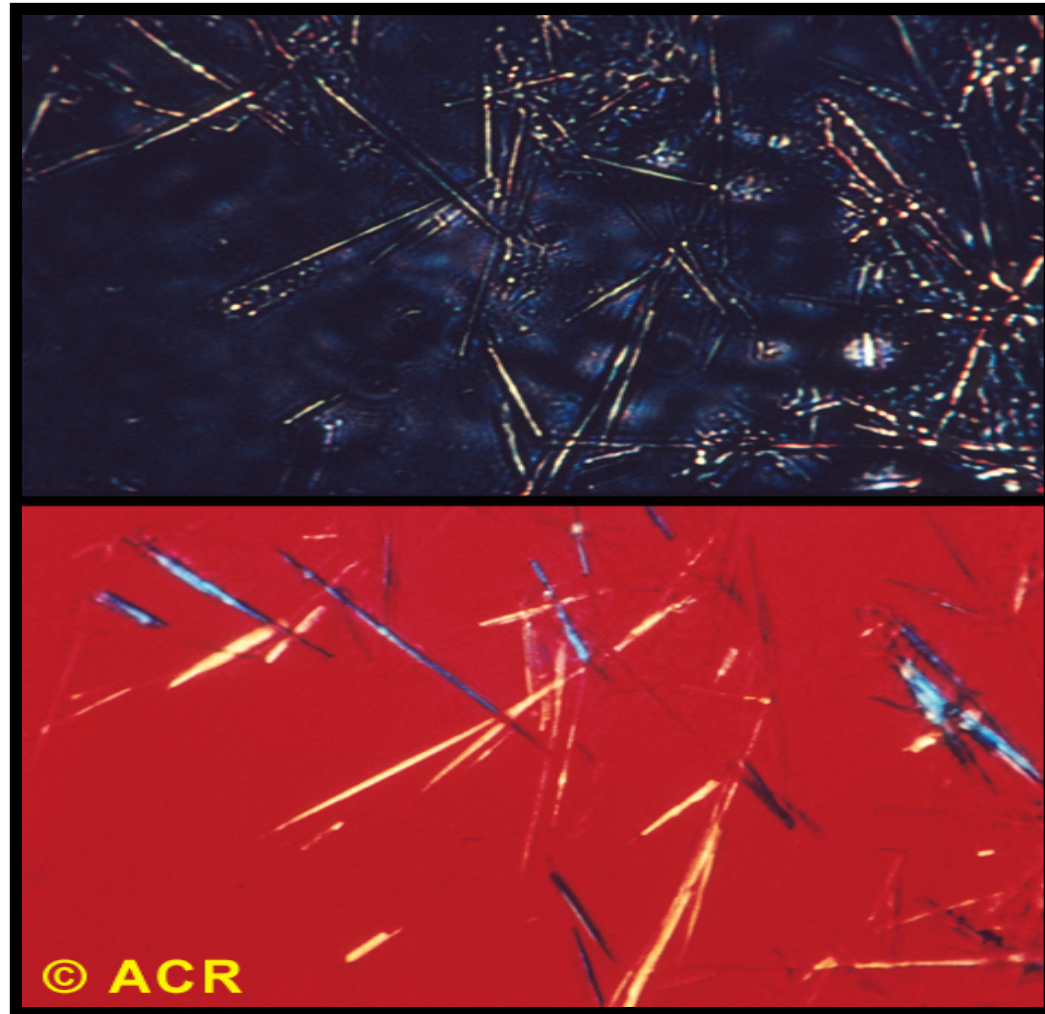
Limitations of Telerheumatology

- Since tactile portion of examination is important, evaluation of new patients is very operator dependent
- Follow up patients need to be evaluated for disease activity and drug toxicity, availability of ancillary studies at the time of the visit is critical
- Examination of extra-articular manifestations can be crucial and may be difficult.

Can Technology Help with Telerheumatology?

- Laboratory
- Radiographs
- CT scans
- MRI
- Ultrasound
- Thermography
- Pressure sensors, gait analysis

Gout: urate crystals (ordinary and polarized light microscopy)



Rheumatoid factor

- Antibody directed against the Fc portion of IgG
- Present in approximately 80% of RA patients
- May be involved in disease pathogenesis
- Higher levels tend to be associated with poorer prognosis
- Found in other rheumatologic and non-rheumatologic conditions



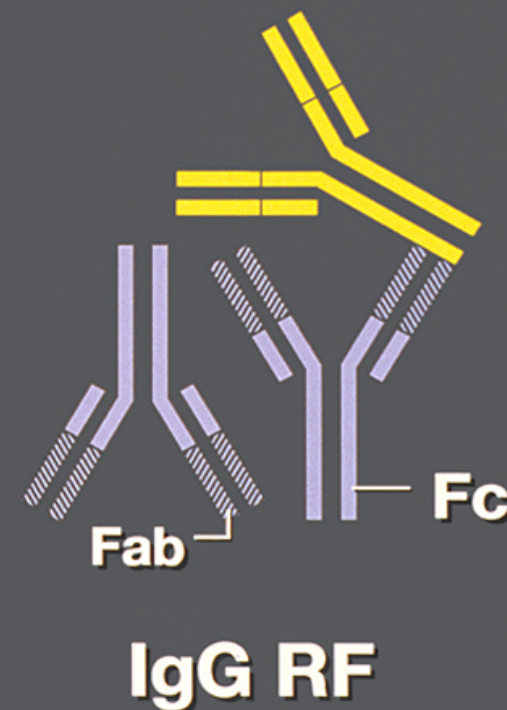
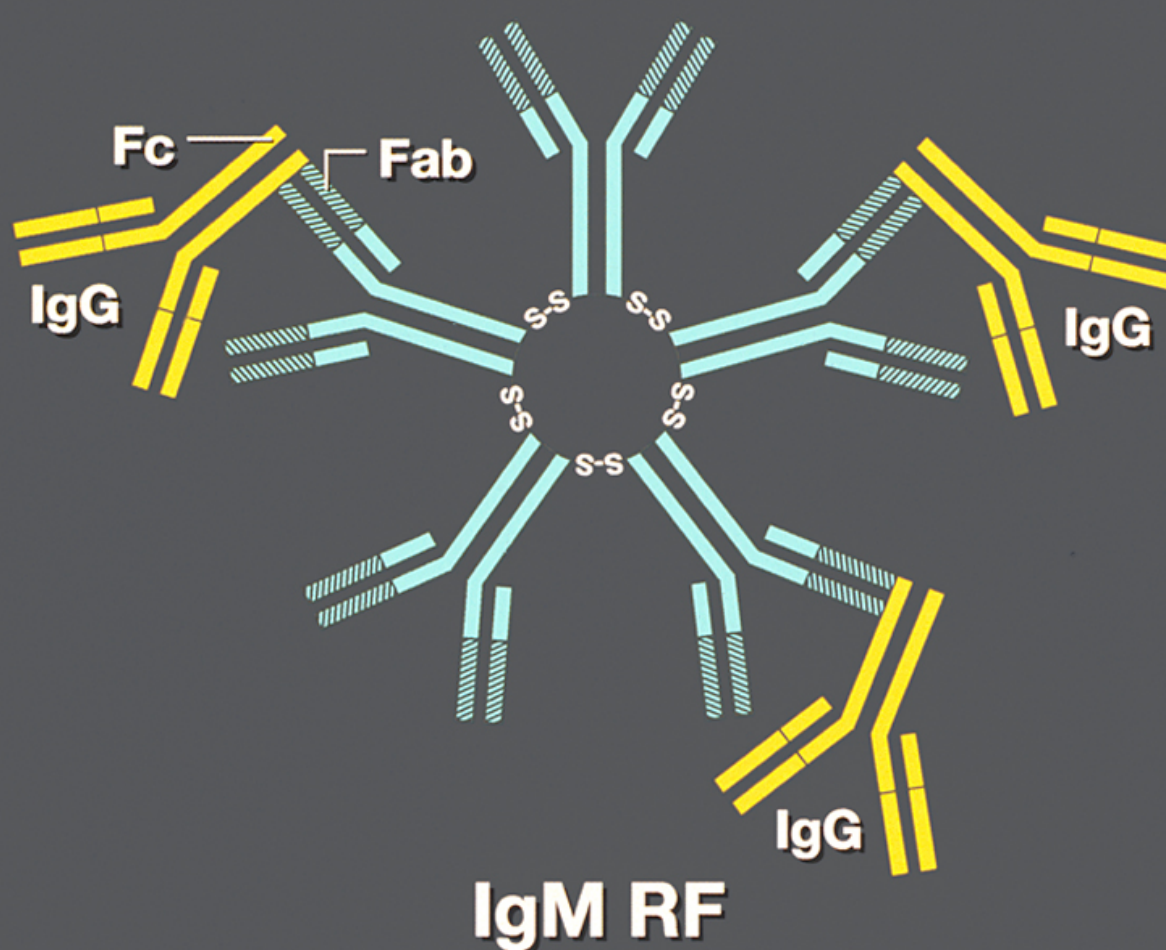
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Rheumatoid factor in rheumatic disease

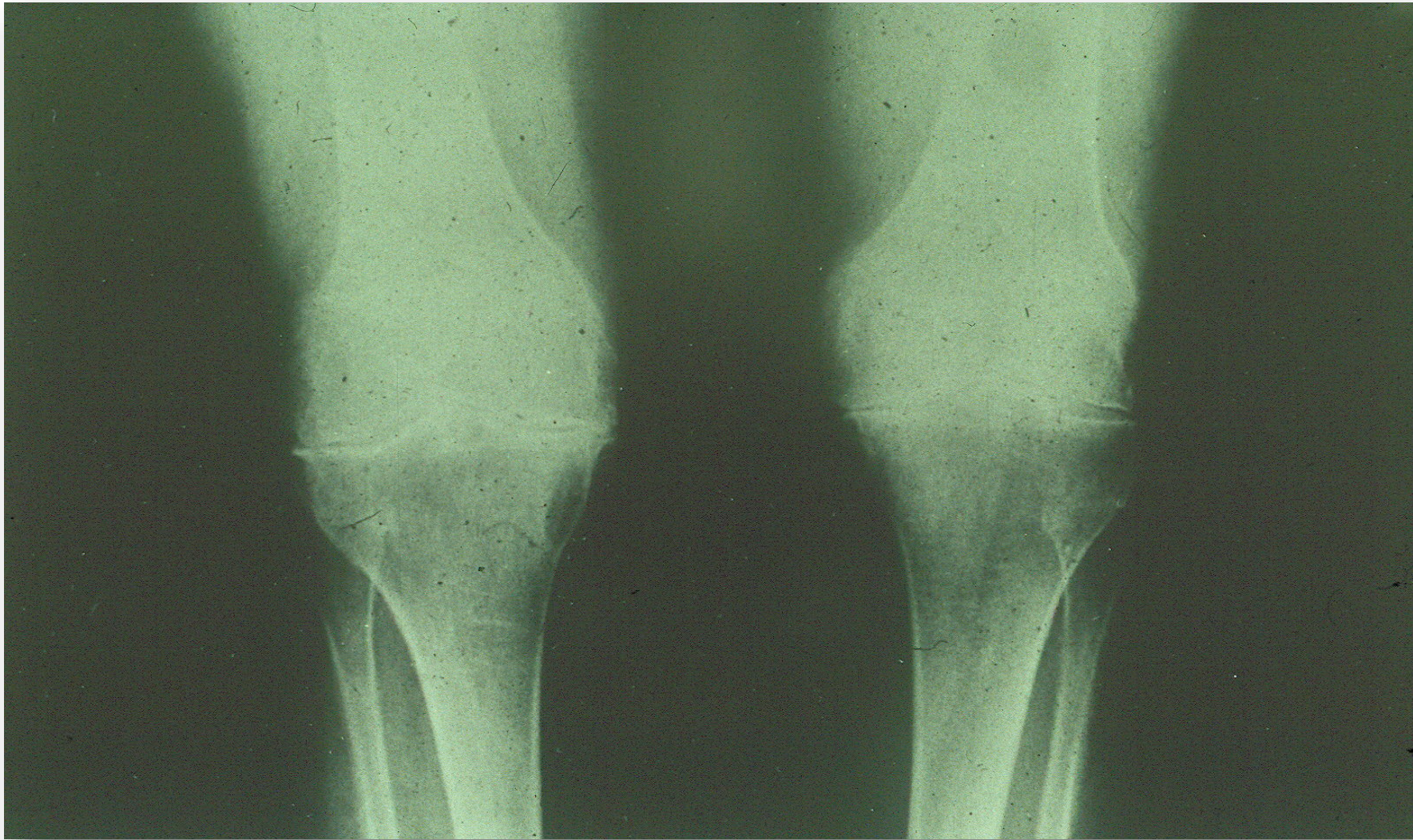
- Rheumatoid arthritis
- Systemic lupus erythematosus
- Sjögren's syndrome
- Systemic sclerosis
- Dermatomyositis/polymyositis
- Vasculitis
- Cryoglobulinemia
- Juvenile rheumatoid arthritis

Rheumatoid factor in non-rheumatic diseases

- Normal individuals (< 5%)
- Elderly
- Bacterial infections
 - Endocarditis
 - Leprosy
 - Syphilis
 - Lyme disease
 - Periodontal disease
- Viral infections
 - Hepatitis C (also A & B)
 - Parvovirus
 - Rubella
 - CMV
 - HIV
 - EBV
- Parasitic diseases

Rheumatoid factor in non-rheumatic diseases

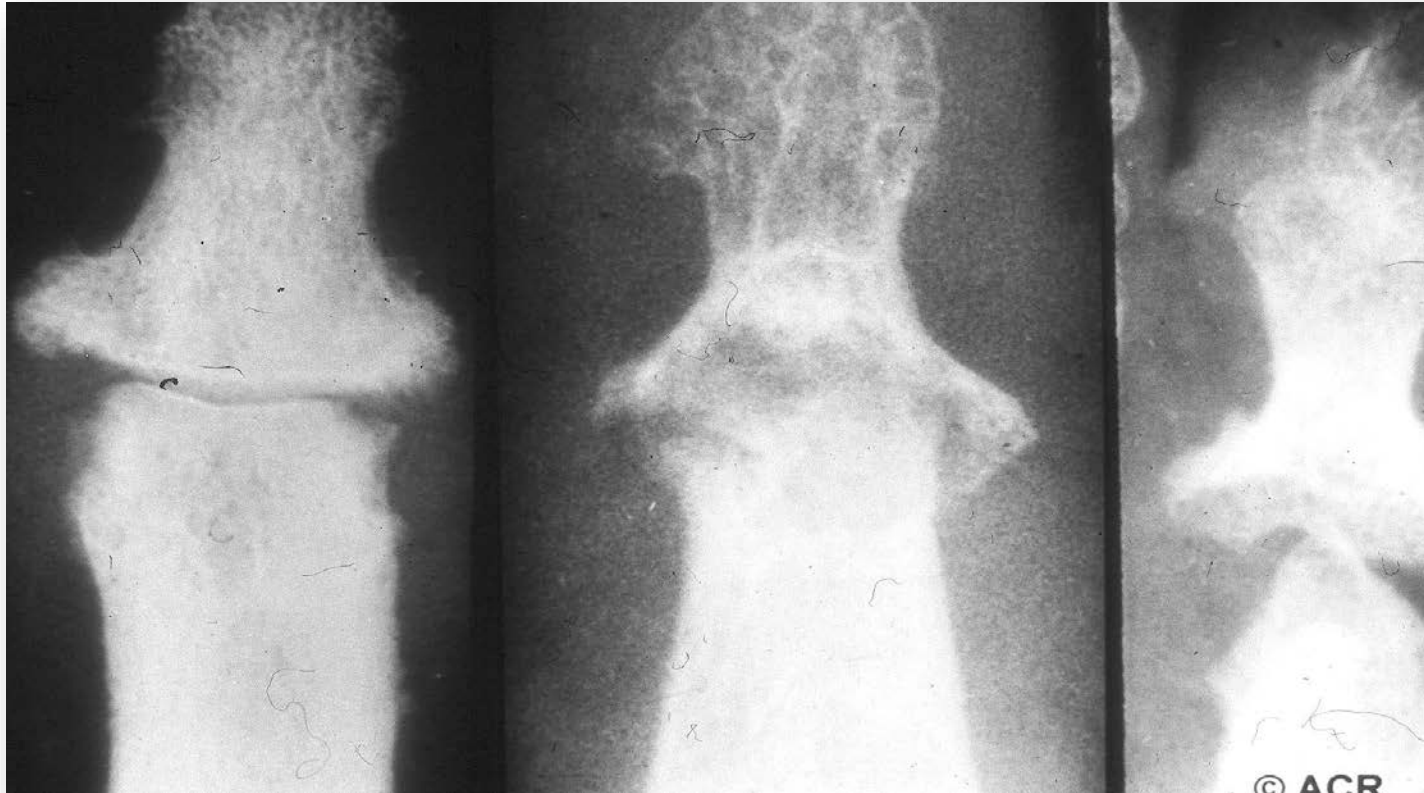
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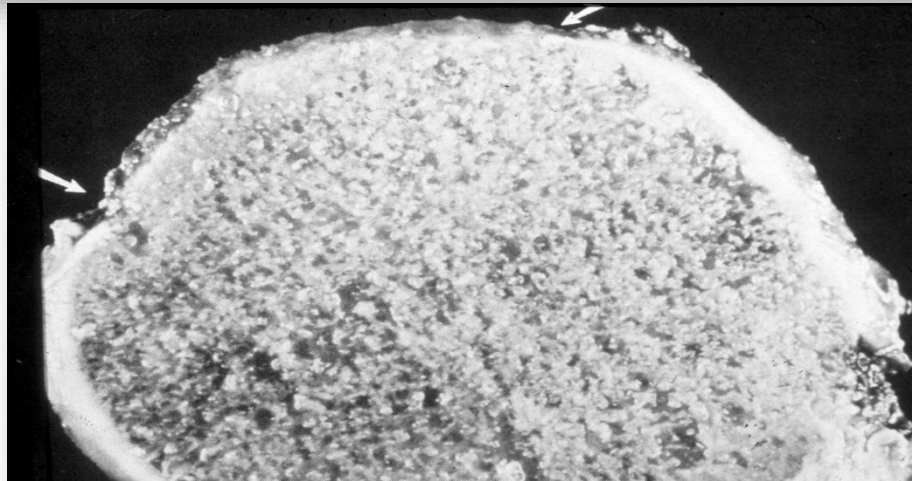
Radiographs can be very useful in Diagnosis of Rheumatic Diseases

Psoriatic arthritis – progression:

Periostitis -> Resorption -> Pencil in Cup



Staph septic arthritis of the hip

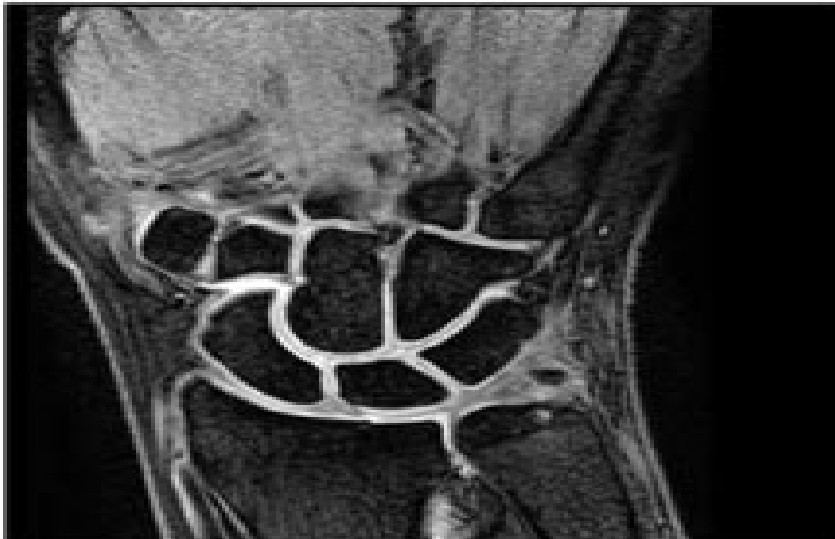
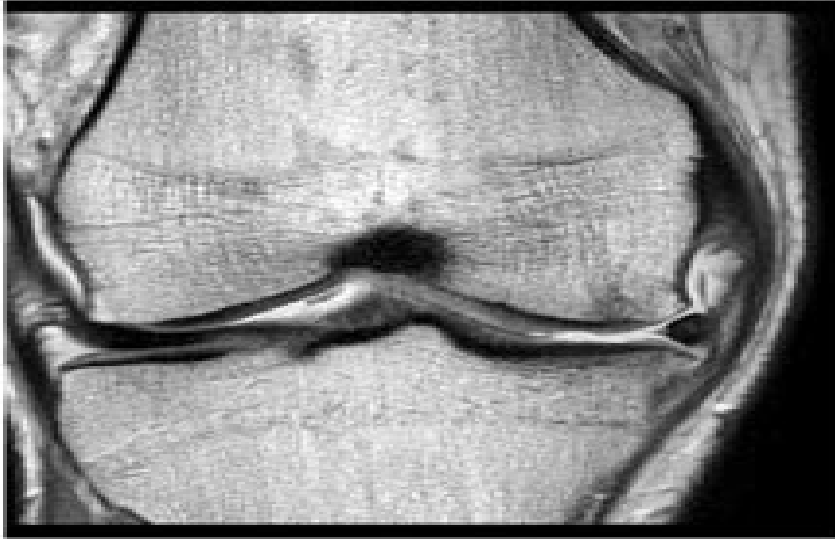




Dual-energy CT scans very easily detect uric acid crystals (gout crystals) in joints. Affected joints will appear green on imaging (right image).

Conventional radiographs (left image) fail to demonstrate uric acid crystals in joints. These crystals are imperceptible.

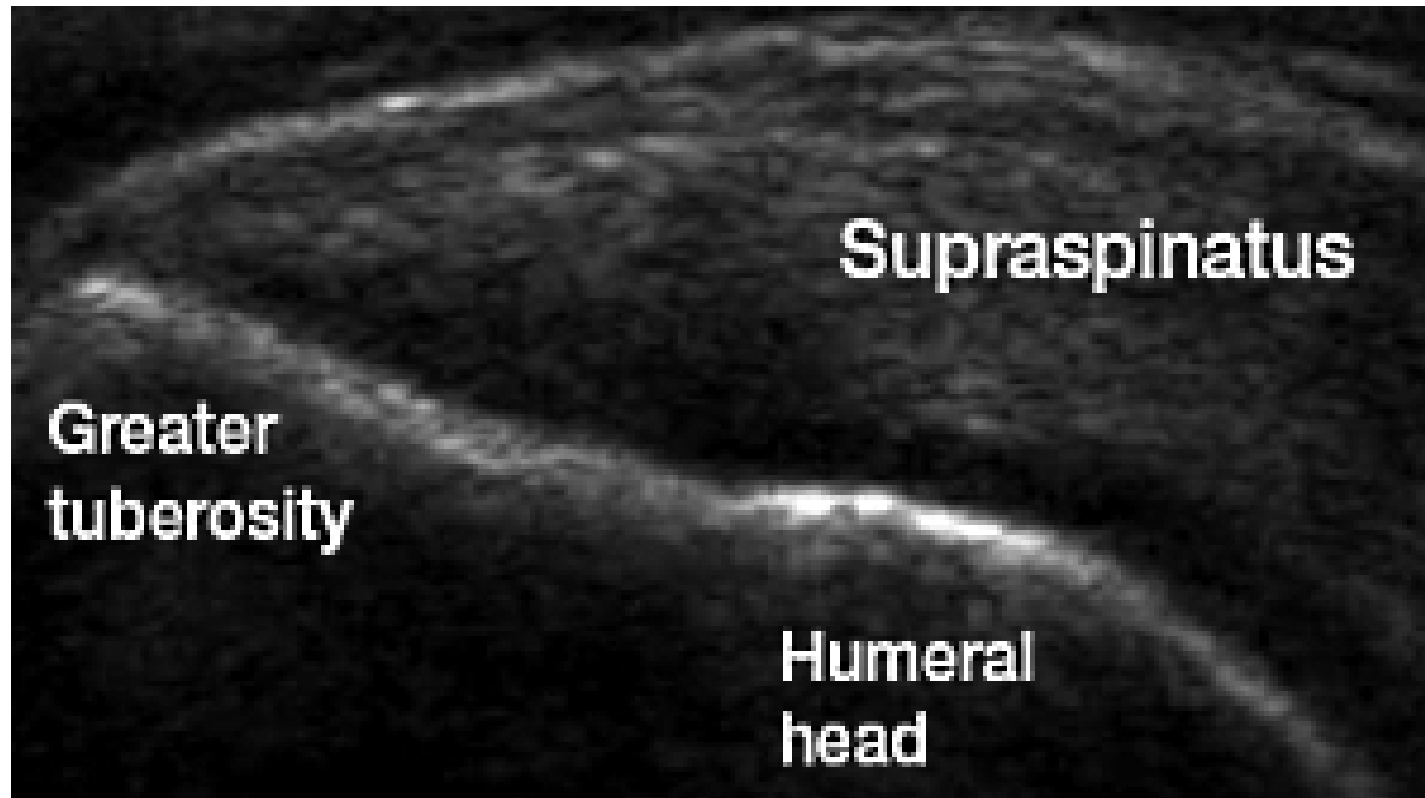
Musculoskeletal MRI



Limitations

- Laboratory tests, CT scans, MRIs, Radiographs all have physical and procedural limitations that do not allow them to be performed in real time
- However, review of prior studies is invaluable

Musculoskeletal Ultrasound



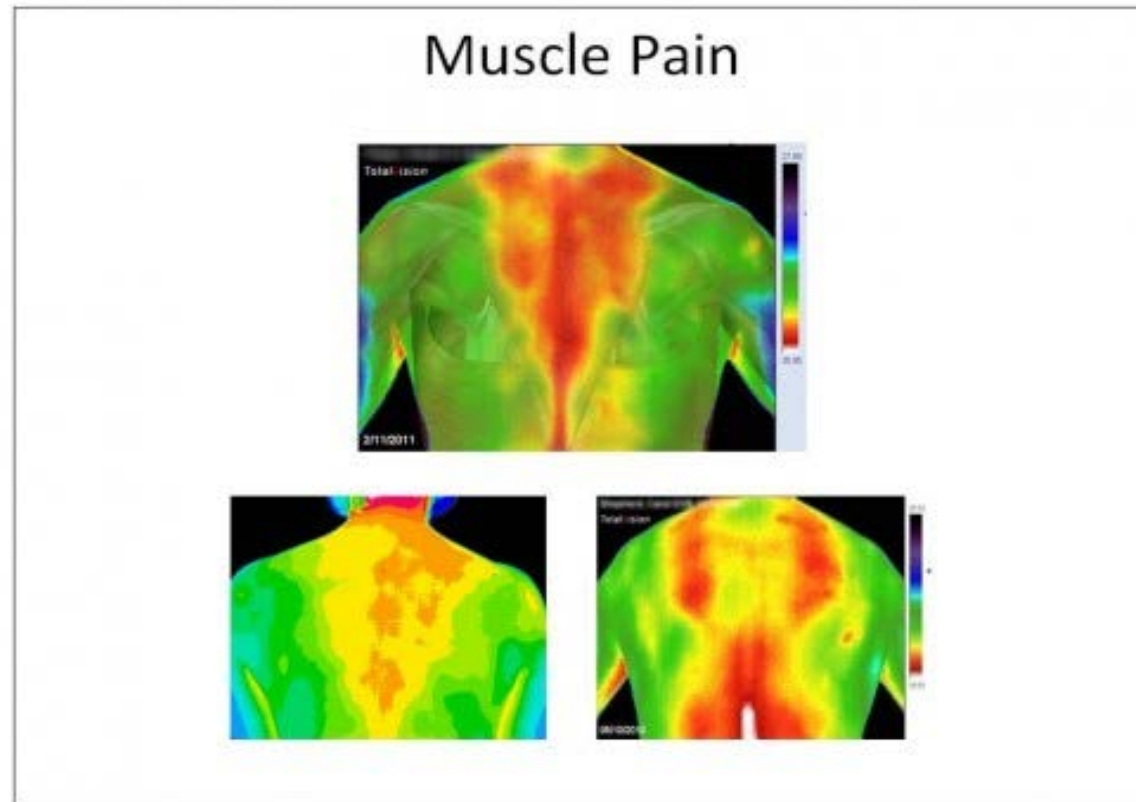
Promise and Problems with MSK Ultrasound

- Can be used in real time
- Relatively inexpensive
- No radiation or magnetic shielding needed
- Very operator dependent/requires special training

Musculoskeletal Thermography



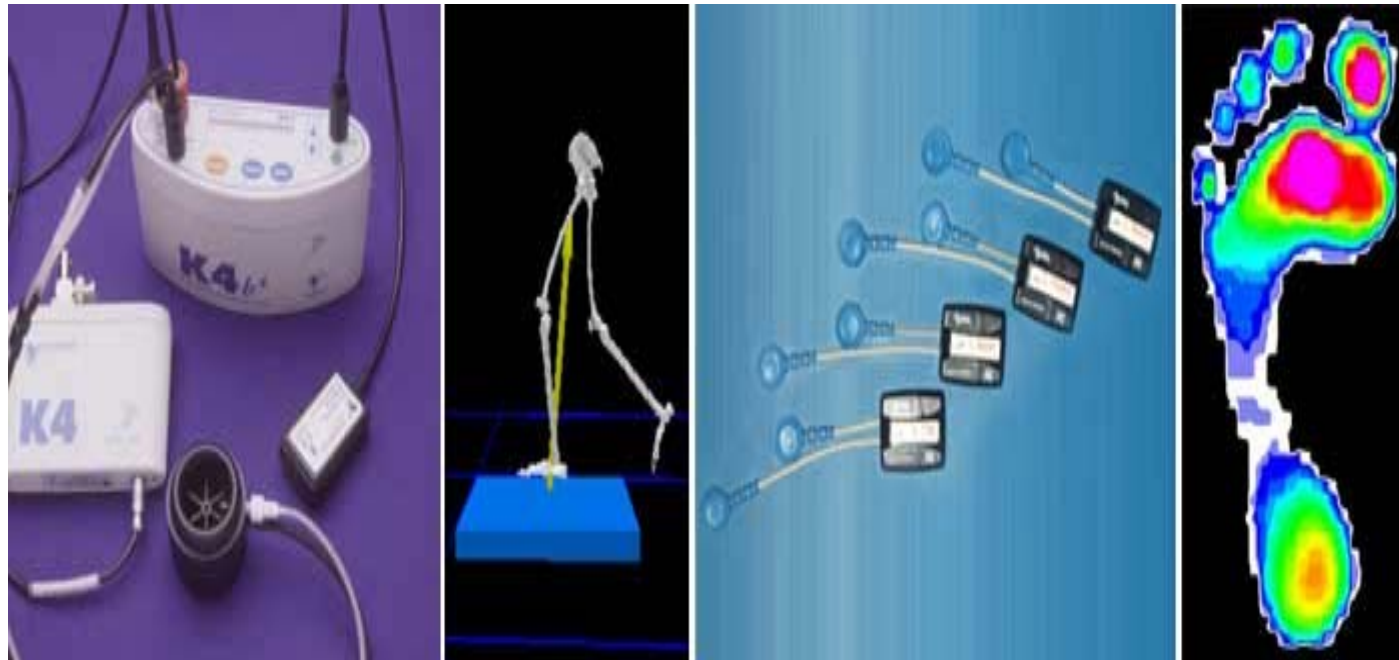
Musculoskeletal Thermography



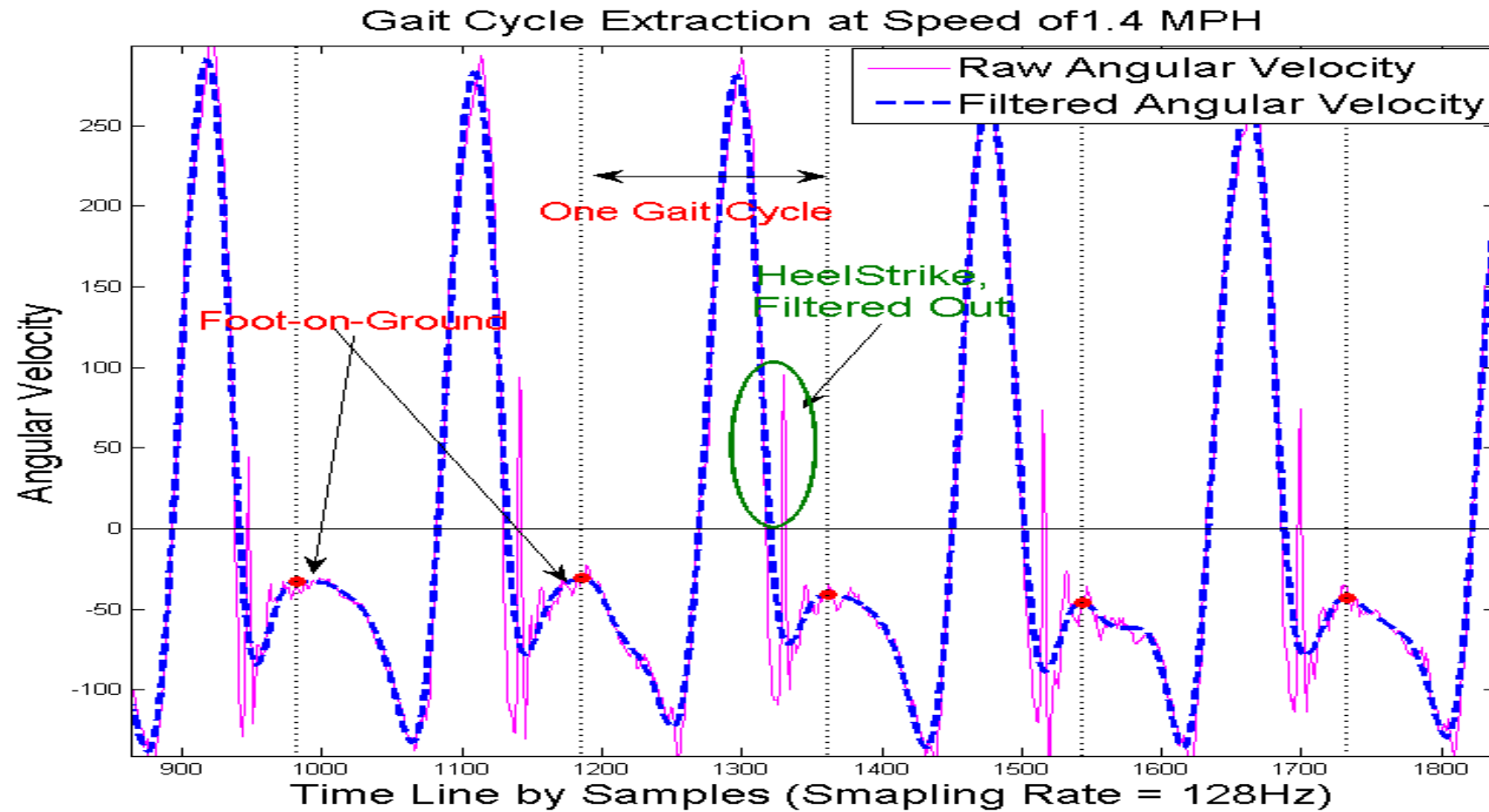
Promise and Problems with Musculoskeletal Thermography

- No need for radiation or magnetic shielding
- Relatively inexpensive
- Can adapt cameras to look at infrared spectrum
- Not heavily operator dependent
- Primarily qualitative
- Dependent on interpretation of pattern
- Can be used longitudinally to measure response

Gait and Joint Motion Analysis



Gait Analysis Data



Promises and Problems with Motion Analysis

- Can be used before or during encounter
- Measures range of motion, does not explain why
- No radiation or magnetic shielding needed
- Can be worn for extended period
- Used longitudinally to measure response





DON'T DRINK AND DRIVE.
YOU'LL ONLY SPILL IT.



Worth 1000.com

Questions?

jlisse@arthritis.arizona.edu

Improving Access to Quality Medical Care Webinar Series

Next Webinar, September 15, 2015:

Alan Morgan, MPA

Chief Executive Officer

National Rural Health Association

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<http://www.telemedicine.arizona.edu/app/distant-education/upcoming-workshops>



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<https://www.surveymonkey.com/s/SWTRCWebinarSurvey>

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