Musculoskeletal System

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UMDNJ PA Program
Certification and Recertification Review Course
June 6th-9th, 2011

Topics Covered

- Osteoporosis
- Osteoarthritis
- Infectious diseases
- Neoplastic diseases
- Rheumatologic conditions
- Disorders of the shoulder
- Disorders of the forearm/wrist/hand
- Disorders of the back/spine
- Disorders of the hip
- Disorders of the knee
- Disorders of the ankle/foot

Osteoporosis

- Caused by **loss of bone matrix and mineral**
- Risk Factors: **Caucasian or Asian** women with a small, thin build; **smoking history**; **excessive ETOH** intake; sedentary lifestyle; low calcium intake

Osteoporosis cont'd

- **Primary** causes are post-menopausal (due to loss of estrogen) and senile osteoporosis (calcium deficiency and ↓ Vit. D intake).
- **Secondary** causes are **corticosteroid** use, hyperthyroidism, hypothyroidism, hyperparathyroidism, diabetes and Cushing's disease.

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Osteoporosis cont'd

- DEXA Scan used to quantify bone mass

Interpretation of results:
Normal-within 1 SD of young adult reference
Osteopenia-bet. 1.0-2.4 SD below reference
Osteoporosis-2.5 or more SD below reference

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Osteoporosis cont'd

- Can lead to significant fractures with relatively little trauma
- Most often **vertebral bodies (most common),** hip, pelvis, distal radius
- May need bone scan, CT or MRI to confirm fracture

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Osteoporosis Treatment

- Lifestyle modifications
  - Weight bearing exercises
  - Adequate dietary intake of Ca++ and Vit D
  - Use of walker or cane for balance
  - Balance exercises
  - Avoid smoking and alcohol

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Osteoporosis Treatment

- Calcium 1200-1500 mg/day plus 400 IU of Vitamin D
- Bisphosphanates (i.e. Fosamax, Boniva)
- Raloxifene (selective est. receptor modulator)
- HRT- but must weigh risks and benefits
- Teriparatide (Forteo)
- Miacalcin nasal spray

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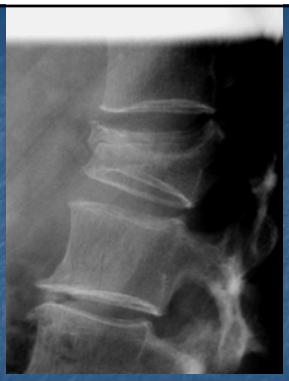

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Osteoarthritis-DJD

Idiopathic, **non-inflammatory arthritis**

S/S: -joint stiffness in AM-relieved with activity
-pain with wt-bearing-relieved with rest
-crepitus, joint swelling, ↓ ROM
-**Heberden's** DIP nodes (common)
-**Bouchard's** PIP nodes (less common)

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Osteoarthritis-DJD cont'd

Dx: -x-ray shows **narrow joint space**, **osteophytes**, sclerosis of bone and bony cyst formation

Tx: -first line-acetaminophen, NSAIDs, steroid injections, viscosupplementation
-surgery when QOL is diminished

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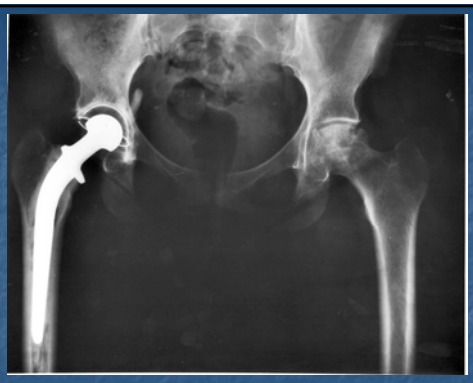

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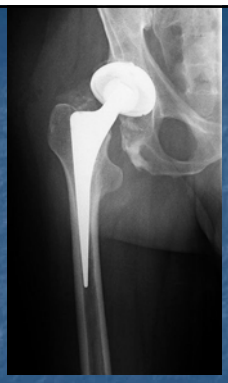

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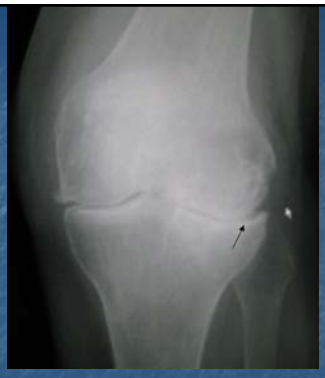

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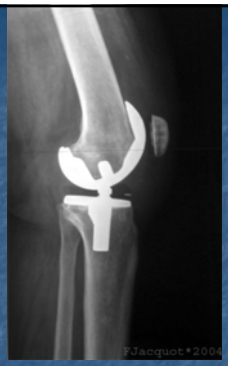

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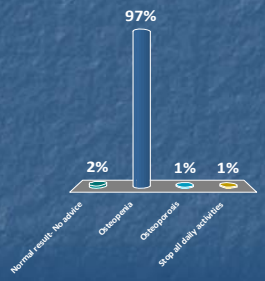
A patient returns to the office to discuss her DEXA scan results. Her "T" score is -1.25 SD. How would advise the patient at this time?

1. Normal result- No advice
2. ✓ Osteopenia
3. Osteoporosis
4. Stop all daily activities



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Infectious Diseases

- Acute Osteomyelitis
- Chronic Osteomyelitis
- Septic Arthritis

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Acute Osteomyelitis

Hematogenous spread of bacteria (S. aureus most common) or direct contamination of bone (≤ 2 weeks)

-often affects the long bones of children

-in adults >50 y/o, often occurs in spine

S/S: -fever, chills, and malaise
-local warmth and swelling
-refusal to use affected limb

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Acute Osteomyelitis cont'd

Dx: -↑ WBC, ESR, CRP, "+" blood cultures
-bone biopsy to confirm bacteria
-bone scan and MRI helpful early

Tx: -IV ABx 4-6 wks, then oral 6-8 wks
-surgical debridement if fail to improve or if spine involved

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Chronic Osteomyelitis

Untreated blood infection or exogenous untreated trauma/infection (≥ 2 weeks)

S/S: -mild fever and mild ↑ ESR & CRP
-onset of inflammation or cellulitis
-persistent drainage, sequestrum of dead bone or walled off pus

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Chronic Osteomyelitis cont'd

Dx: -x-ray shows bone destruction and periosteal elevation
-may confirm with bone scan, indium scan, MRI, or CT

Tx: -long term IV Abx (bacteria specific)
-surgical I & D, possible amputation

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Septic Arthritis

Hematogenous spread, most common organisms- **N. gonorrhea, S. Aureus & group A Strep**

S/S: -joint swelling, redness, & limited, **painful ROM**
-with N. gonorrhea may have lesions on palms and soles of feet

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Septic Arthritis cont'd

Dx: -often see ↑ WBC, ESR, CRP
-confirm with "+" culture from blood, joint or GU system
-joint fluid- WBC > 50 K, polys > 80% and decreased glucose

Tx: -rest, ice, elevation, daily aspiration w/ saline irrigation or **arthroscopic I&D**, IV ABx
-if not better in 2 days-open I & D

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Neoplastic Diseases

- Ganglion cysts
- Bone cysts/tumors
- Osteosarcoma/Ewing Sarcoma

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Ganglion Cysts

Most common benign tumor of the wrist

S/S: -**painless, fluid filled mass** usually at wrist
-may fluctuate in size

Dx: -clinical

Tx: -wrist splinting
-aspiration w/ steroid injection
-surgical excision

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Bone Tumors

- Benign- asymptomatic, x-ray shows **well-defined lesion w/ sclerotic margins** which suggests slow growth
- Malignant- present with pain and palpable mass, x-ray shows a **permeative lesion w/ lytic destruction** and poorly defined margins which suggests rapid growth

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Bone Cysts

Cavity in bone filled with something other than bone (fluid or blood), usually in pts 5-20 y/o

S/S: -usually asymptomatic until pathologic fracture

Dx: -often found on routine x-ray
-confirm w/ biopsy

Tx: -asp/inj w/ steroids or bone marrow
-curettage and bone grafting

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Osteoid Osteoma

Most common benign bone tumor (10%), often found in proximal femur. M>F, young adults

S/S: -aching, night pain **relieved w/ NSAIDs**

Dx: -x-rays

Tx: -symptomatic, if fails-surgical removal

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Osteosarcoma

Except for multiple myeloma, most common primary malignant tumor of bone
-50% found around the knee (distal femur or proximal tibia)
-usually occurs in **ages 15-25 y/o, M>F**

S/S: -**persistent (night) pain** and swelling
-palpable mass

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Osteosarcoma cont'd

Dx: -x-ray, destructive lesion w/ periosteal elevation and **"sun ray" appearance**
-bone or soft tissue biopsy
-MRI used for staging

Tx: -chemotherapy and surgical resection gives a 70% 5-year survival rate

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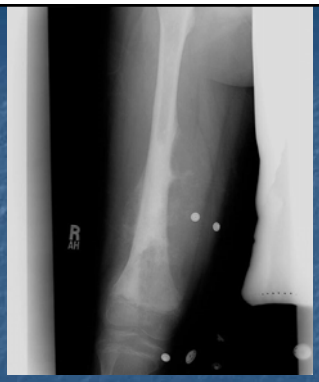

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Ewing Sarcoma

- Most often seen in the **pelvis**, distal femur and proximal tibia. Usually involves the **diaphysis and metaphysis** of the bone.
- Occurs in those 5-25 years old
- Males > females

S/S: pain, fever, elevated ESR and WBC

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Ewing Sarcoma

Dx: x-ray shows lytic lesion of the diaphysis/metaphysis that is permeative and destructive. Often referred to as **"onion skin appearance"**

Tx: surgical resection, chemotherapy and radiation.

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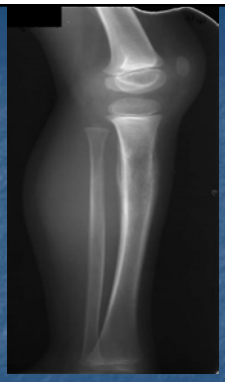

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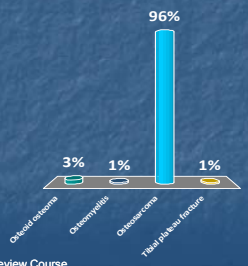
A 14 y/o female presents with knee pain and a bump below her knee for 2 months that hurts day and night. X-ray shows a destructive process in the proximal tibia with a sunburst appearance.

1. Osteoid osteoma
2. Osteomyelitis
3. ✓ Osteosarcoma
4. Tibial plateau fracture



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Rheumatologic Conditions

Fibromyalgia

May affect 3-10% of population, age 20-50, F > M
Associated with hypothyroidism, RA or sleep apnea in men

S/S: -musculoskeletal pain around neck, shoulders, low back and hips
-fatigue, numbness and headaches
-**no PE findings except trigger points**

Tx: -patient education, mod. exercise program
-TCA's, Cymbalta, Lyrica/Neurontin, ultram/acetam
-trigger point injections

Gout (Podagra)

Caused by **under excretion or overproduction of uric acid**, 90 % male

At risk if on thiazide or loop diuretics, cyclosporine, ASA and niacin, also at risk with high ETOH intake, high purine diet, multiple myeloma, myeloproliferative disorder, hypothyroidism, psoriasis, sarcoidosis and lead poisoning

Gout cont'd

S/S: -fever and **sudden onset** of monoarticular joint swelling with exquisite pain & tense, warm, dusky red skin
-may evolve into chronic polyarthritis
-may develop tophi on ears, hands, elbows and feet if not treated

Dx: -uric acid >7.5, increased ESR and WBC
-synovial fluid- "+" sodium urate crystals, **negatively birefringent** and needle like

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Gout cont'd

Tx: **Acute**- NSAIDs or intraarticular or IV corticosteroids (must r/o septic arthritis)
Chronic- colchicine
undersecretion-probenicid or uricosuric agent
overproduction- allopurinol

Chronic management- weight loss, increase dairy, limit ETOH intake, red meat, sardines, lentils, oatmeal, spinach, mushrooms, asparagus, cauliflower and drugs known to cause gout

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Pseudogout (CPPD-calcium pyrophosphate dihydrate)

Recurrent arthritis in large joints, knee and wrist most common

S/S: -similar presentation as gout

Dx: -normal uric acid levels and synovial fluid shows rhomboid shaped crystals that are **positively birefringent**

Tx: -NSAIDs, colchicine and intraarticular steroids (r/o septic arthritis)

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Juvenile RA

- Affects females > males
- Two peaks- 1-3 years and 8-12 years
- 15% of cases are seropositive for RF, if so more likely to progress to adult RA

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Juvenile RA cont'd

3 different types:

- **15% systemic**- Still's disease- fever, rash, lymphadenopathy, carditis, splenomegaly, arthritis
- **35% polyarticular**- low grade fever and synovitis/arthritis in 5 or more joints
- **50% pauciarticular**- synovitis in 1-4 joints with no systemic symptoms, increased incidence of iridocyclitis/uveitis

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Juvenile RA cont'd

Dx: -may have intermittent fevers and morning stiffness

-may have normal or elevated WBC
-ESR and CRP elevated

-50% "+" ANA, RF usually neg, Anti-CCP may be "+" and has high specificity for RA

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Juvenile RA cont'd

Tx: -NSAIDs, methotrexate, nighttime splinting, exams with slit lamp 2-4x/year

- 75% resolve without serious disability, those that are RF "+" have highest risk for persistent, severe disease

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Polyarteritis Nodosa

Necrotizing arteritis of medium sized vessels. Affects 30 in 1 million.
-30% of cases are caused by **Hepatitis B**

S/S: -fever, malaise, weight loss, extremity pain, mononeuritis multiplex (foot drop), livido reticularis, SQ nodules, skin ulcers- digital gangrene, abdominal pain, nausea, vomiting

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Polyarteritis Nodosa cont'd

Dx: -**requires tissue bx or angiogram**
-may present with hypertension, anemia, leukocytosis, elevated ESR
-low or negative for RF, ANA, ANCA
-must r/o Hepatitis B

Tx: -**high dose corticosteroids**, IV methyl-prednisolone, cyclophosphamide
-Hep B + prednisone, lamivudine, plasmaphoresis
-survival 10% w/o tx, 60-90% w/ tx

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Polymyositis

Systemic disorder of unknown cause, peaks in 5-6th decades, affects females > males and blacks > whites, can be assoc. with **malignancy in up to 20%**

S/S: -**progressive neck & proximal muscle weakness of UE & LE**
-25% have dysphagia
-reddish-purple maculopapular rash

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Polymyositis cont'd

Dx: -**muscle biopsy**
-increased CPK, aldolase, ESR
-may have "+" ANA & anti-JO 1 antibodies

Tx: -corticosteroids (oral & topical used), methotrexate, azathioprine, IVIG
-look for malignancy

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Polymyalgia Rheumatica

Vasculitis affecting patients > 50, often **assoc. with giant cell arteritis** (50%)

S/S: -aching, stiffness of shoulder and pelvic girdle
-fever, malaise, anorexia
-muscle pain, no true weakness

Dx: -**markedly ↑ ESR** , anemia

Tx: -**low-dose steroids** up to 1 year

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Reactive Arthritis

Tetrad of conjunctivitis, urethritis, aseptic arthritis and oral lesions, after enteritis or STI (40% NGU), males affected 9:1

S/S: -fever, arthritis (knee/ankle), urethral discharge, conjunctivitis, oral lesions

Dx: -anemia, leukocytosis, thrombocytosis
-increased ESR, **80% HLA-B27 "+"**

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Reactive Arthritis cont'd

Dx: -x-rays may show signs of permanent or progressive joint destruction

Tx: -NSAIDs, physical therapy
-less likely to develop if original infection treated with antibiotics

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Rheumatoid Arthritis

Idiopathic, chronic systemic inflammatory disease chiefly **affecting the synovial membranes.** Onset 20-40 y/o affecting females 3:1. **Pannus** develops and erodes articular cartilage.

S/S: -malaise, wt. loss, fever, sub-Q nodules, Sjogren's syndrome
-must have at least **4 of following from the diagnostic criteria**

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Rheumatoid Arthritis, cont'd

Diagnostic Criteria (must have 4 of the following)

- morning stiffness lasting > 1 hour
- arthritis in 3 or more joints for > 6 weeks
- arthritis in hand joints for > 6 weeks
- symm. arthritis in PIP/MCP/MTP > 6 weeks
- rheumatoid nodules
- positive rheumatoid factor
- radiographic changes

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Rheumatoid Arthritis, cont'd

S/S: late- **ulnar deviation, Boutonniere & Swan Neck deformities** and Felty's syndrome

Dx: -elevated ESR & CRP, anemia
-jt fluid:"-" culture and WBC 3000- 50,000
-**Anti-CCP (spc 95%),** RF "+" (80%)
-x-rays may show soft tissue swelling, juxta-articular demineralization, uniform joint space narrowing (after 6 months)
-prone to C1-2 subluxation

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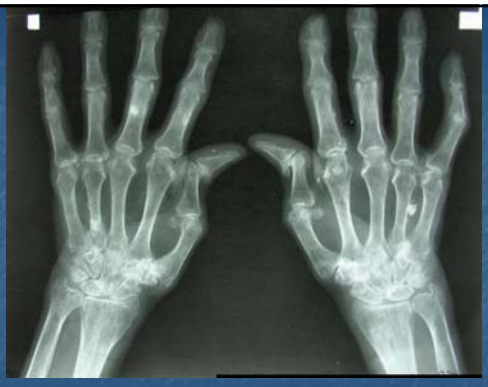

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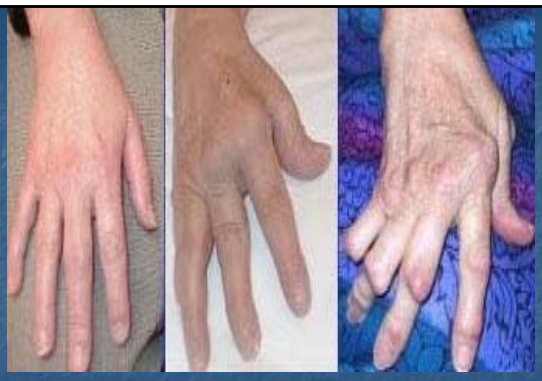

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Rheumatoid Arthritis, cont'd

Treatment goals- decrease inflammation/pain, preserve function and prevent deformity

Tx: -education, PT, rest, assistive devices, splints, weight loss

-NSAIDs, DMARDs (**when dx is made**)- 1st-methotrexate, anakima, etanercept, infliximab, TNF inhibitors, leflunomide, antimalarials, corticosteroids, sulfasalazine

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Systemic Lupus Erythematosus

Inflammatory **autoimmune disease that affects multiple organs**. Can be caused by certain medications.

-affects females 8:1 and is more common in Blacks

-often has relapsing and remitting periods

-associated with HLA DR2 and DR3 haplotypes

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SLE cont'd

S/S: -initial-fever, anorexia, malaise, wt. loss, rash, alopecia, Raynaud's syndrome, ocular manifestations, arthralgias

-later-pleurisy, pneumonitis, seizures, pericarditis, myocarditis, mesenteric vasculitis, psychosis, transverse myelitis, glomerulonephritis, interstitial nephritis

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SLE diagnosis

Must meet 4 of the 11 criteria

- Malar rash
- Discoid rash
- Photosensitivity
- Oral ulcers
- Hematologic disorders (anemia, cytopenias)
- Arthritis
- Serositis
- Positive ANA
- Renal disease
- Neurologic disorders (seizures, psychosis)
- Immunologic abnormalities ("+" LE Prep, antibody to native DNA or Smith antibody, false "+" serologic test for syphilis

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SLE diagnosis cont'd

Dx: -decreased complement levels
-**95% positive ANA**
-20% positive RF
-60% positive anti ds-DNA
-**make sure not drug induced**

SLE cont'd

Tx: -education and emotional support
-withdraw drug if drug induced
-meds: corticosteroids, NSAIDs, hydroxychloroquine, danazol, DHEA, cyclophosphamide, azathioprine

SE with steroids-accelerated atherosclerosis, osteoporosis and AVN of bone

Scleroderma

Chronic disorder characterized by diffuse fibrosis of skin and internal organs
Affects adults 30-50 y/o and women 2:1

Limited (80%)- **CREST** and hardening of skin of face and hands

Diffuse (20%)- skin hardening of face, hands, trunk, limbs and internal organs

Scleroderma cont'd

S/S: **initial**: polyarthralgia, fever, malaise, sub-Q calcifications, Raynaud's (90%), esophageal dysmotility, gut hypomotility and teleangiectasias, skin seems thickened with loss of normal skin folds

late: pulmonary fibrosis, pericarditis, heart block, myocardial fibrosis, renal failure

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Scleroderma cont'd

Dx: -anemia, proteinuria
-**90% positive ANA**
-some with positive anti-topoisomerase & anti-centromere antibody
-nail-fold capillary microscopy

Tx: -symptomatic and supportive
-Raynaud's-calcium channel blockers
-HTN crisis due to renal failure-ACE inhibitors

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Sjogren's Syndrome

Autoimmune disease that results in chronic dysfunction of exocrine glands. **Freq. assoc. with RA** and affects females 40-60 y/o 9x more often than males

S/S: -**dry eyes and mouth**, increase risk of dental caries, loss of taste/smell, parotid enlargement

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Sjogren's Syndrome

Dx: -anemia, leukopenia, eosinophilia
-70% positive RF, 90% positive ANA, 65% positive anti SS-A(Ro) & SS-B(La)
-**Schirmer's test**
-lip bx- confirm if lymphoid foci noted

Tx: -**symptomatic and supportive-** tears, hard candy, avoid decongestants, fluoride txs
-pilocarpine or cevimeline

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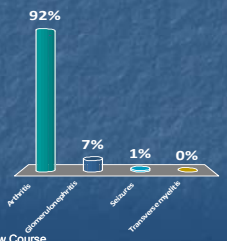
A 27 y/o female presents with fatigue and rash x 2 mos. Exam reveals a rash over the bridge of her nose and on her cheeks and oral ulcers. What other symptom would she most likely have?

1. ✓ Arthritis
2. Glomerulonephritis
3. Seizures
4. Transverse myelitis



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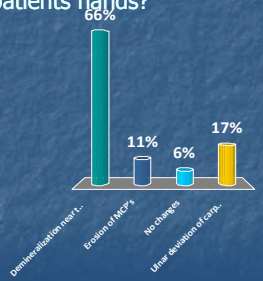
A 34 y/o female presents for f/u of her RA that was diagnosed 1 year ago. She c/o pain and stiffness in her hands that comes and goes. She is currently on methotrexate. What would be expected on x-rays of this patients hands?

1. ✓ Demineralization near the PIP/MCP
2. Erosion of MCP's
3. No changes
4. Ulnar deviation of carpal bones



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