Myositis for Beginners
TMA 2009
Charlotte, North Carolina

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Presentation courtesy of:
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What is Myositis?

- myo = muscle; -itis = inflammation
- "Idiopathic inflammatory myopathy" is most commonly used term
- Heterogeneous group of autoimmune syndromes
- Muscle weakness with inflammation in the muscle tissue
- Systemic complications
- Unknown cause (idiopathic)

Conventional Classification of Myositis

- Adult polymyositis (PM)
- Adult dermatomyositis (DM)
- Juvenile myositis (DM >> PM)
- Malignancy-associated myositis
- Myositis in overlap with another rheumatic disease
- Inclusion body myositis (IBM)

However, there are many other types of myositis that are much more uncommon

Idiopathic Inflammatory Myopathies (IIM)

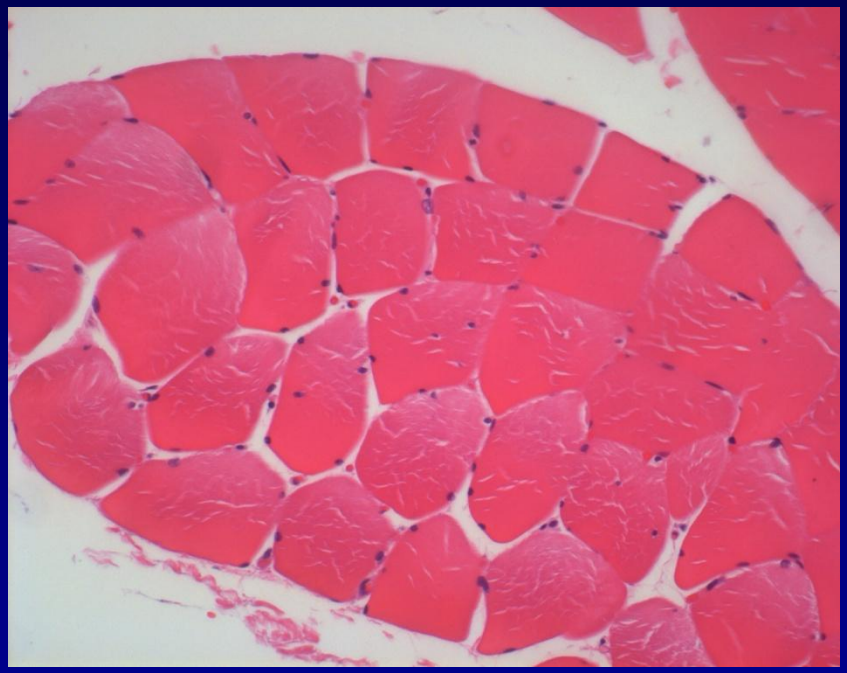
Heterogeneous group of autoimmune syndromes characterized by chronic muscle weakness and muscle inflammation, systemic complications and a cause that is unknown

Autoimmunity

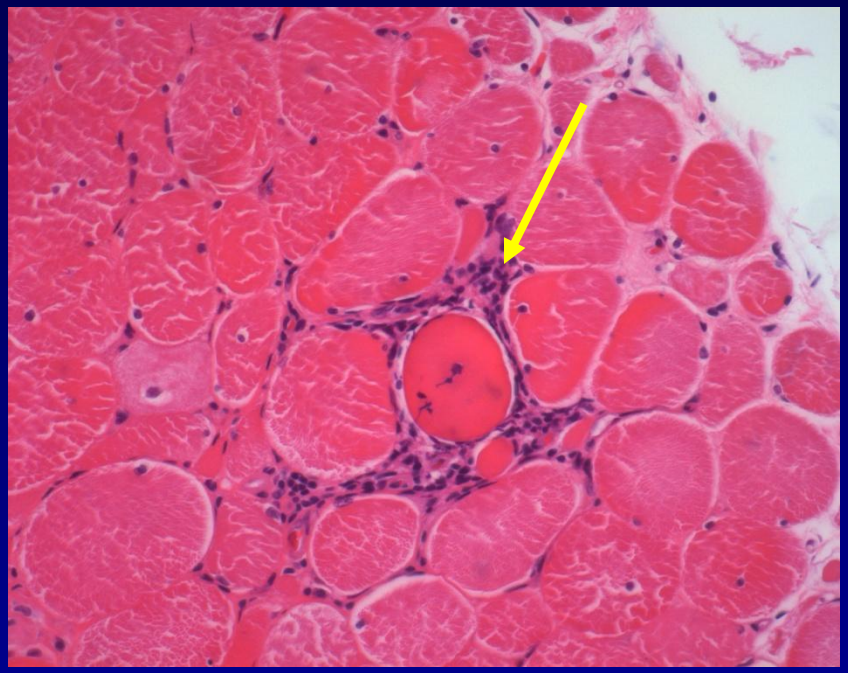
- Immunity vs. autoimmunity
- Individual's immune system attacks its own tissues
- The "target" of the attack can vary
- The clinical features can vary
- Disease names vary: myositis, scleroderma, lupus, rheumatoid arthritis; Sjogren's syndrome
- Autoimmune diseases can "overlap"

Idiopathic Inflammatory Myopathies (IIM)

Heterogeneous group of autoimmune syndromes characterized by chronic muscle weakness and muscle inflammation, systemic complications and a cause that is unknown



Normal Muscle

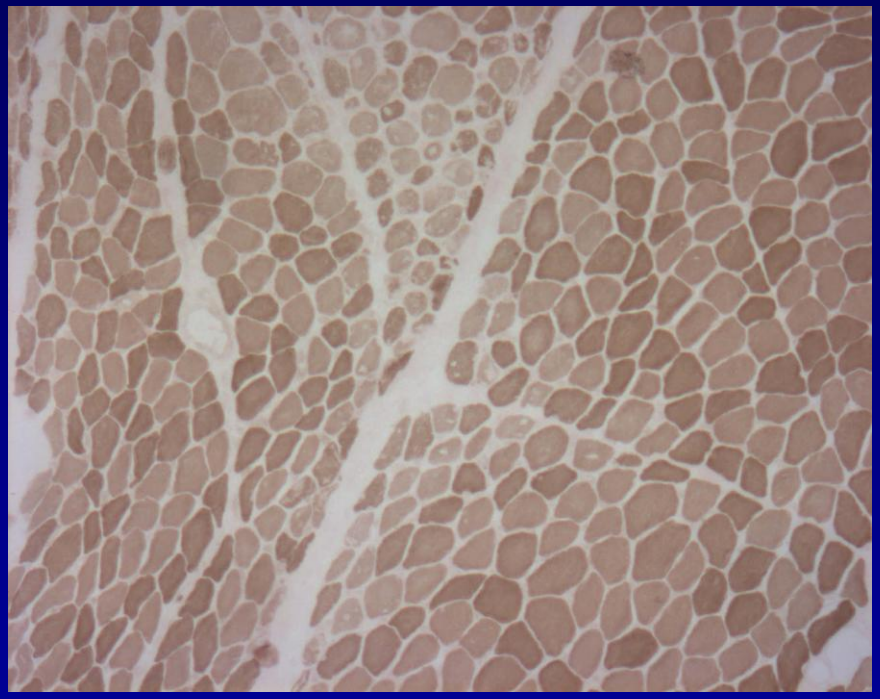


Myositis Muscle

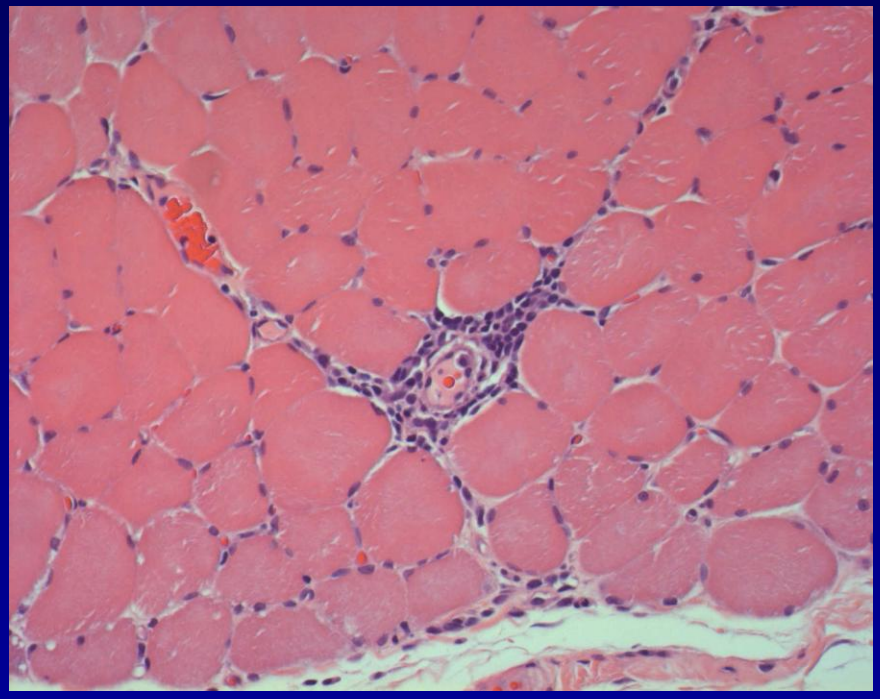
Lymphocytes "attacking" normal muscle tissue

Result: muscle weakness

Dermatomyositis



Perifascicular Atrophy



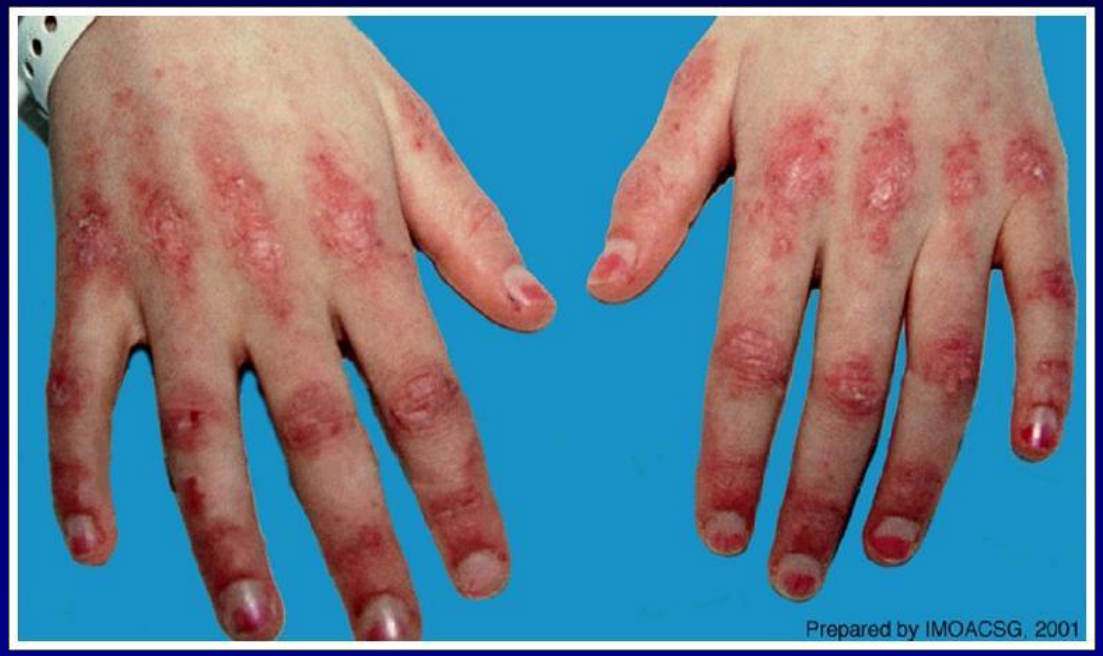
Perivascular Inflammation

Idiopathic Inflammatory Myopathies (IIM)

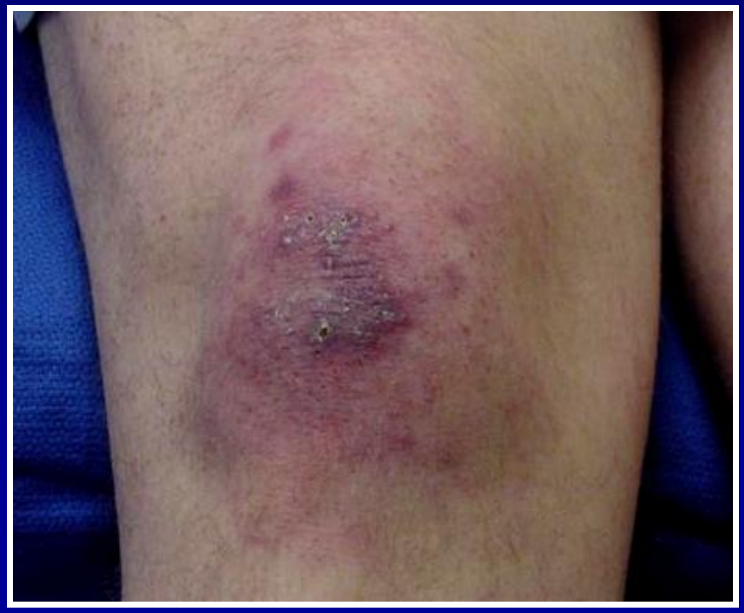
Heterogeneous group of autoimmune syndromes characterized by chronic muscle weakness and muscle inflammation, systemic complications and a cause that is unknown

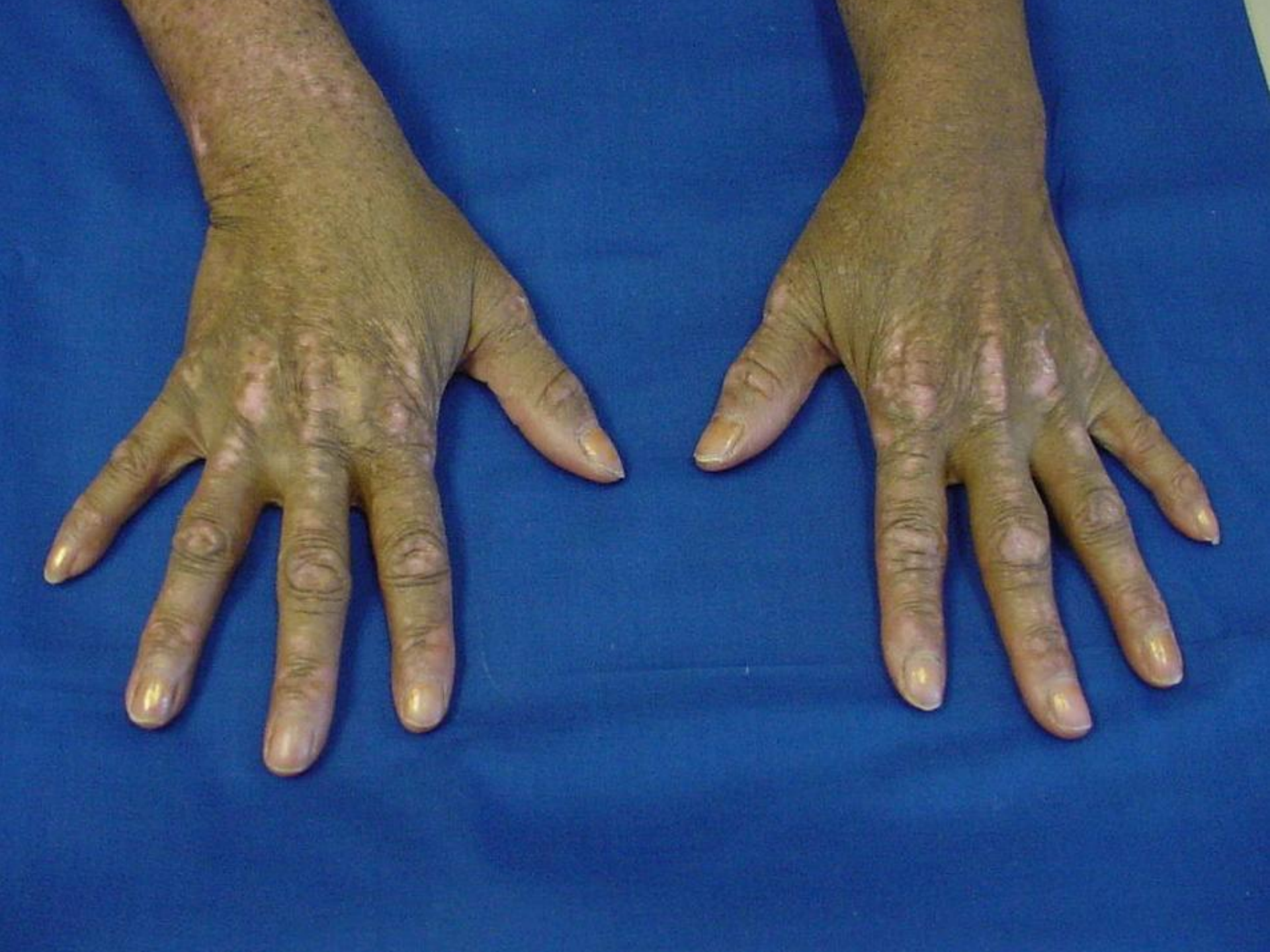
There are many systemic targets in patients with myositis

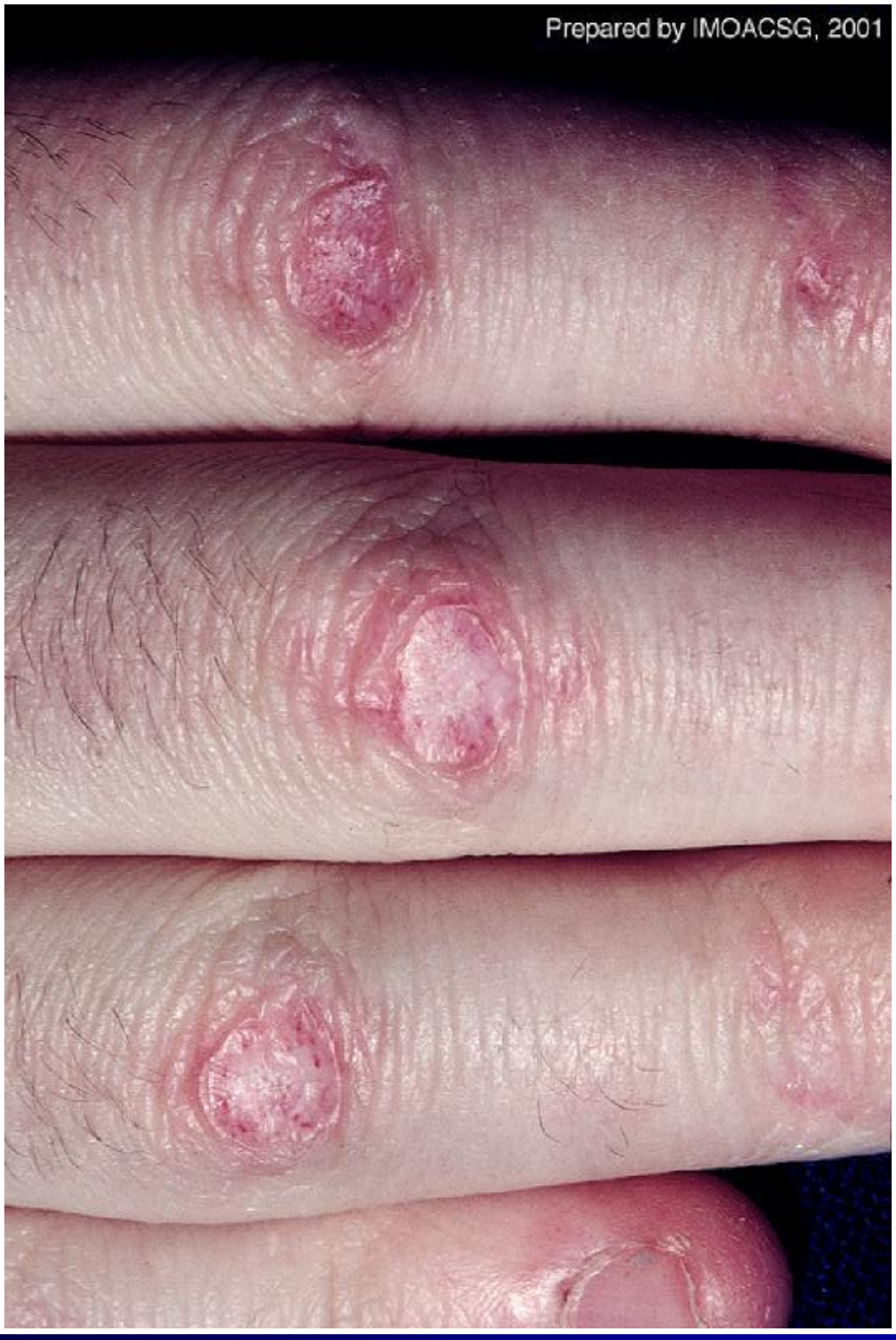
Rashes of Dermatomyositis



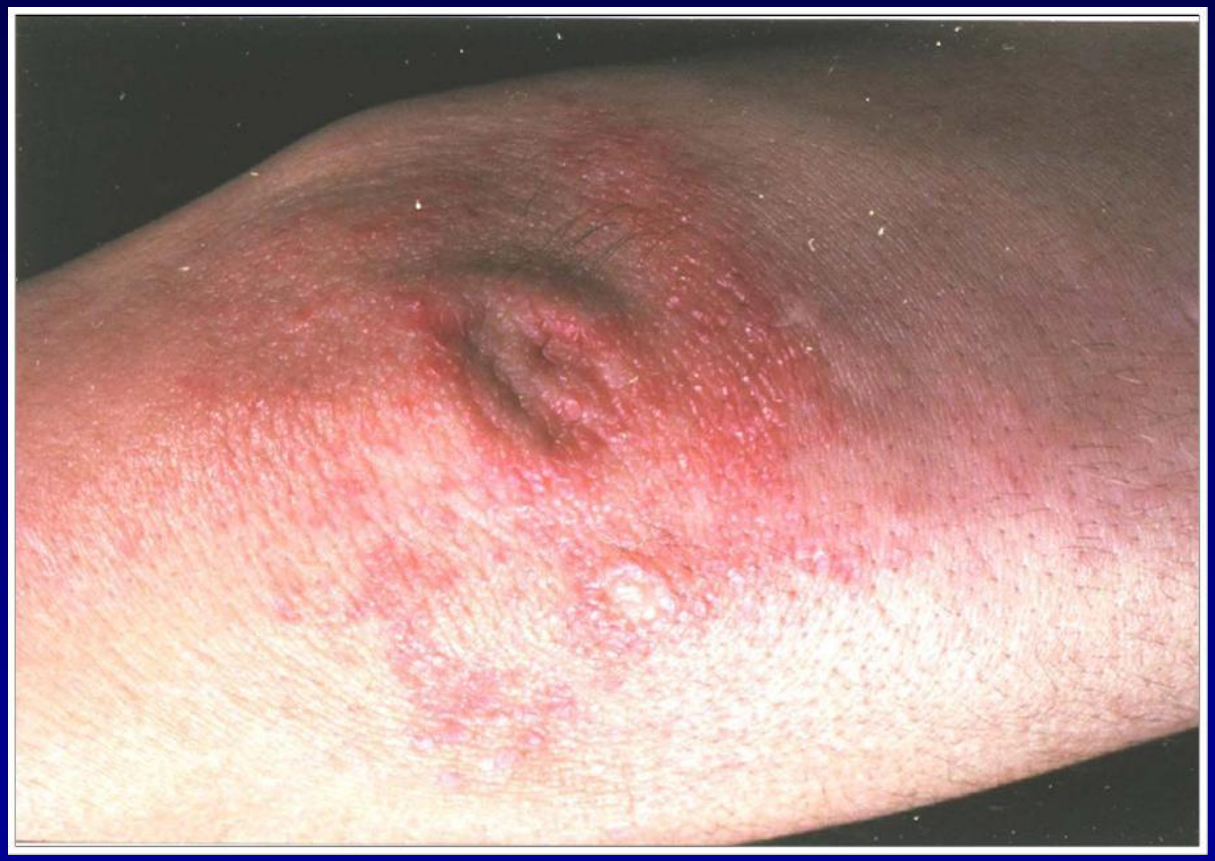
Gottron's Papules





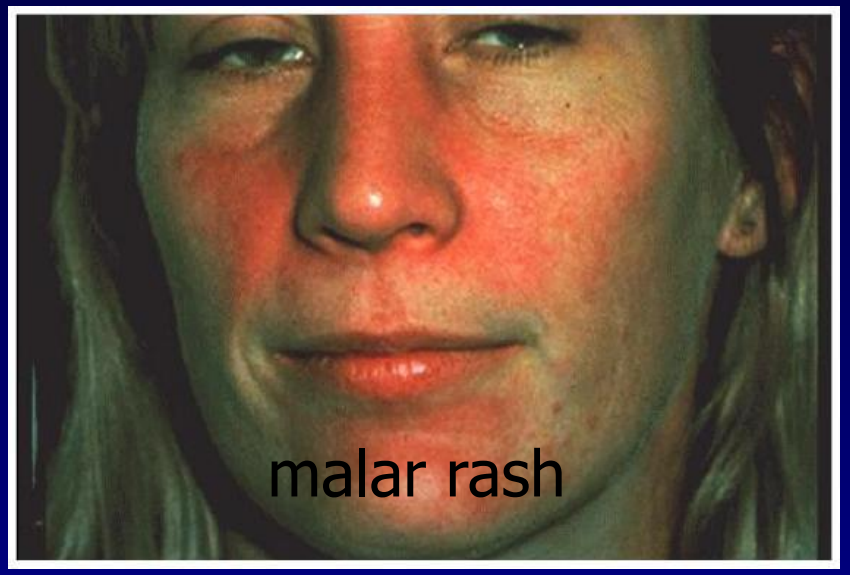

Prepared by IMOACSG, 2001

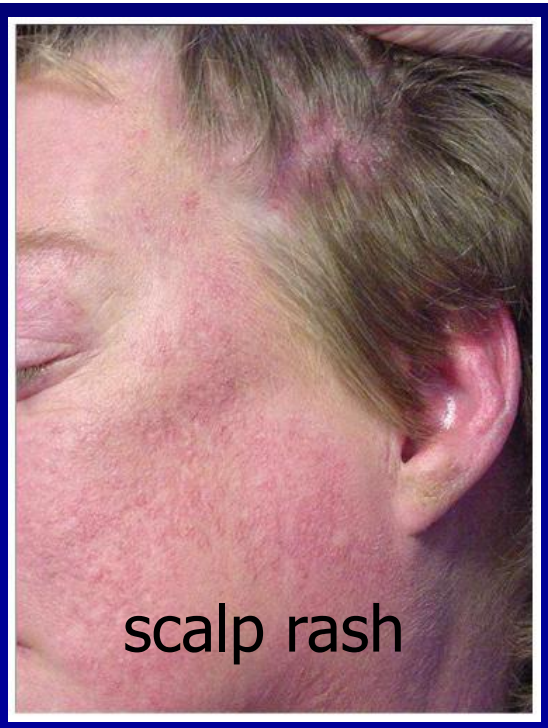
Rashes of Dermatomyositis

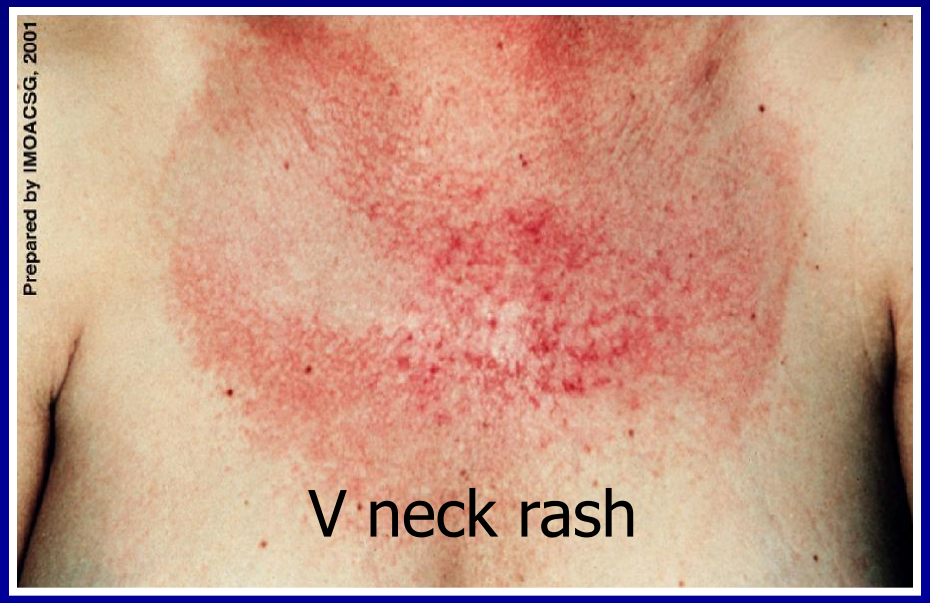


Gottron's sign

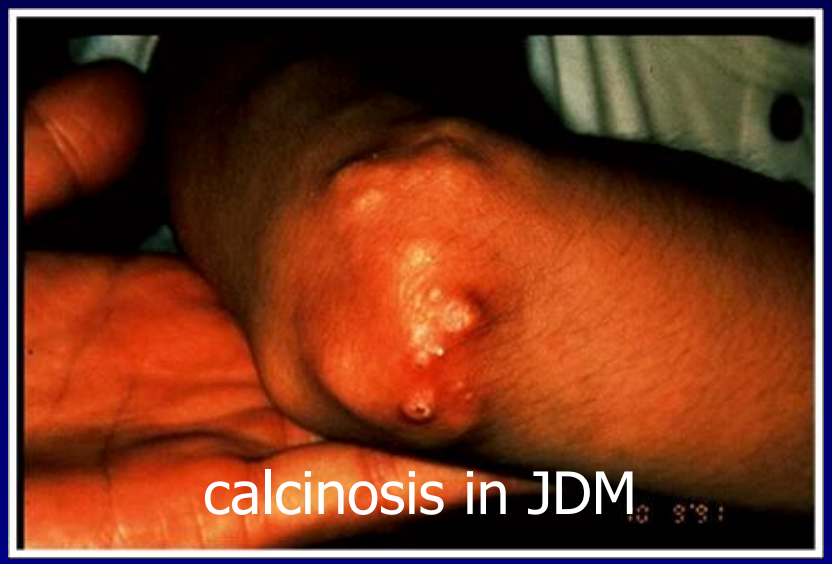
Other Rashes of Dermatomyositis



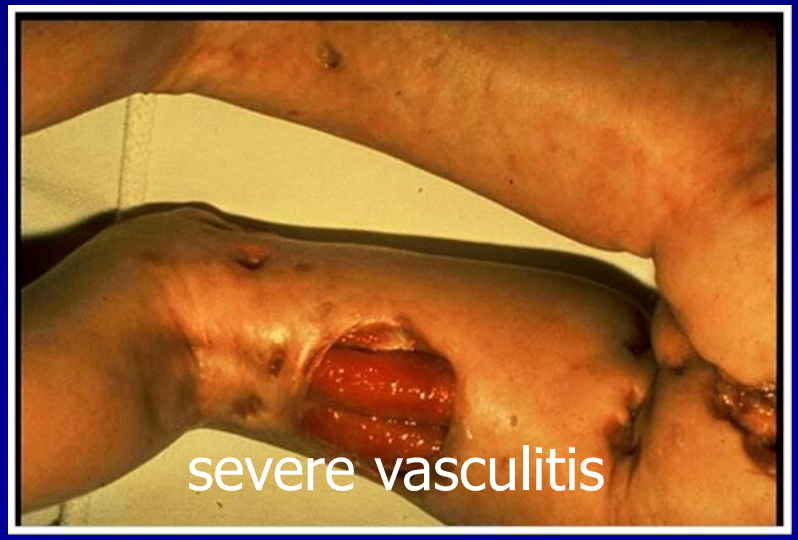




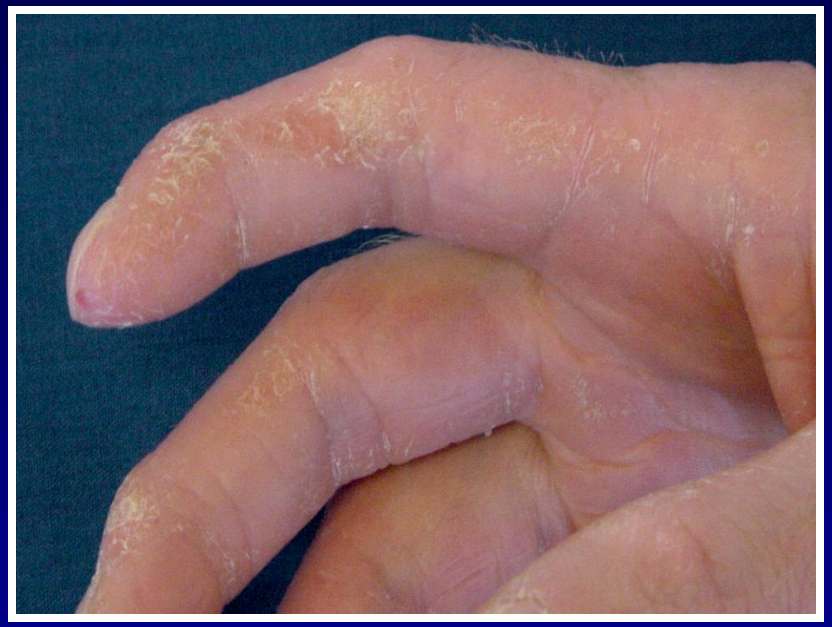
Other Rashes of DM

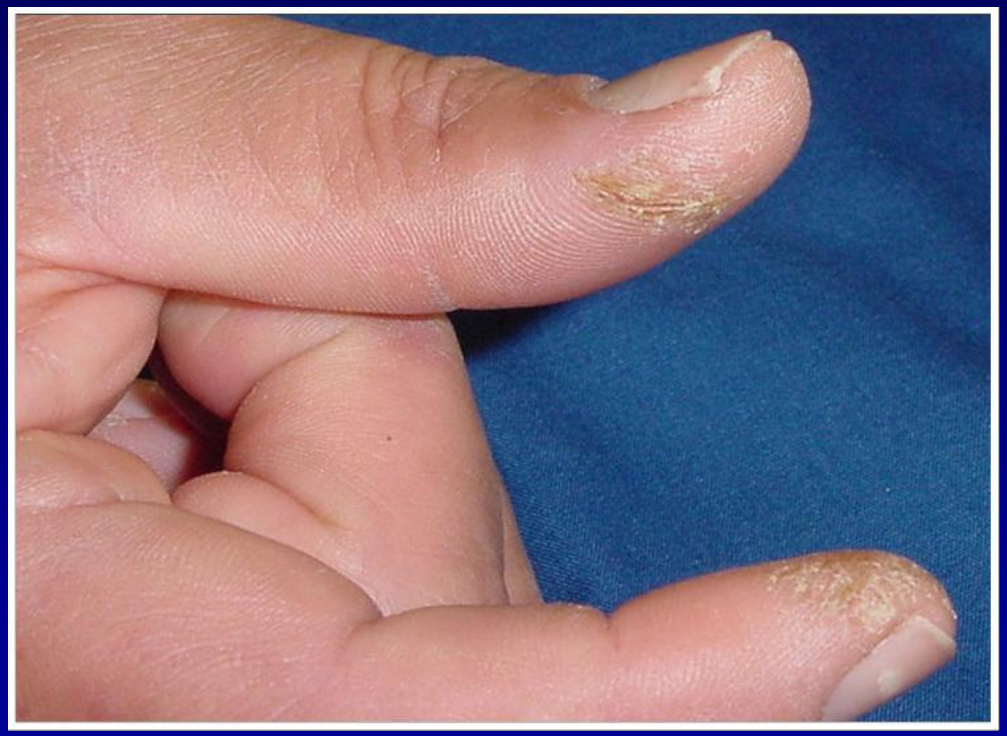

calcinosis in JDM


linear extensor erythema

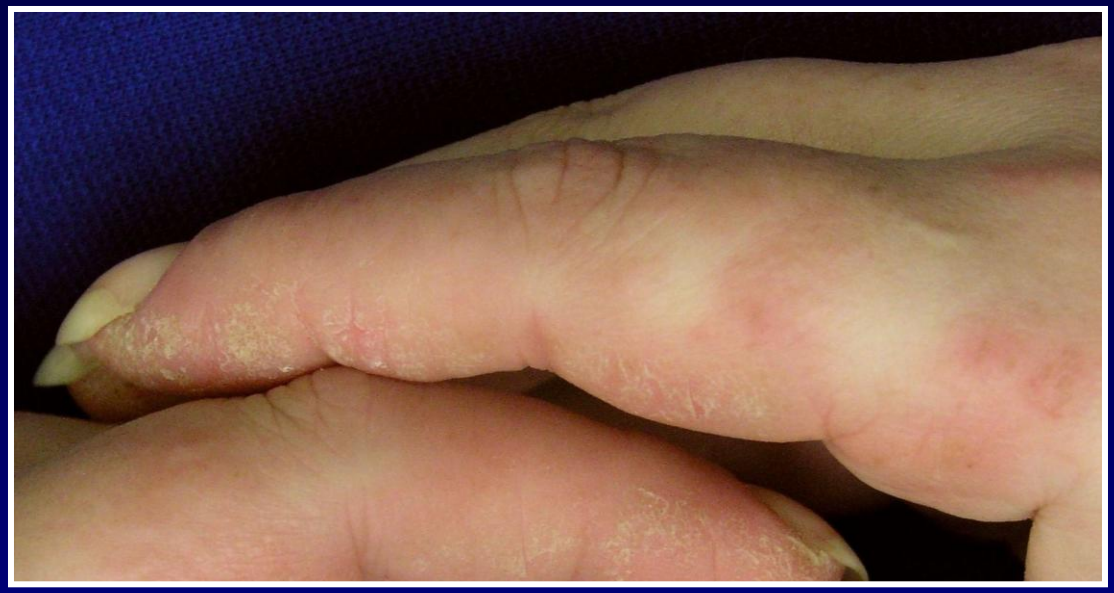

severe vasculitis

Mechanic's Hands

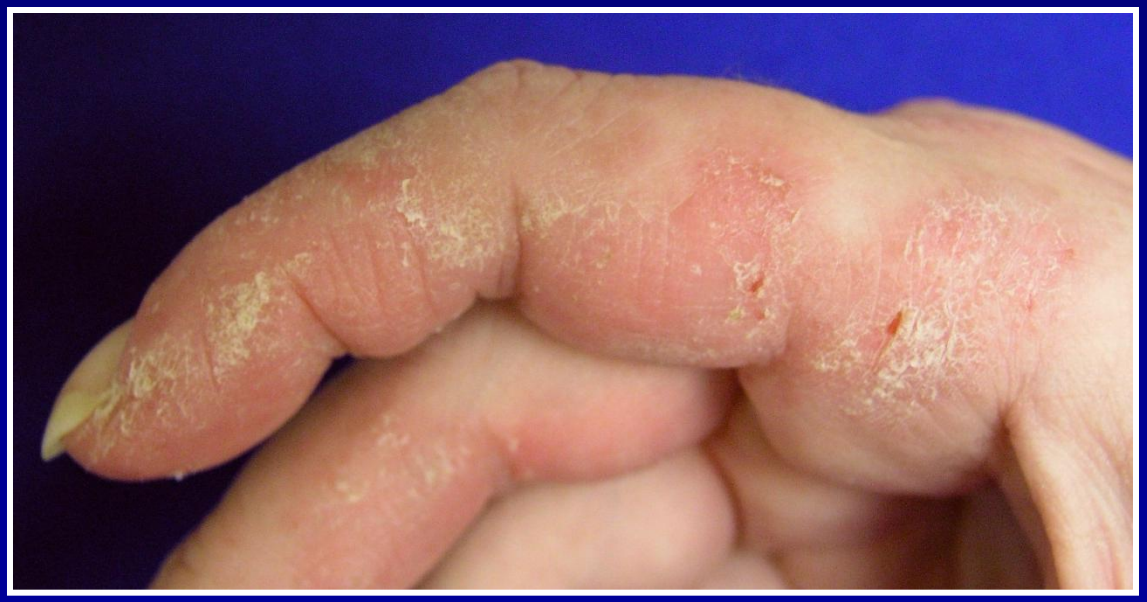




Mechanics Hands

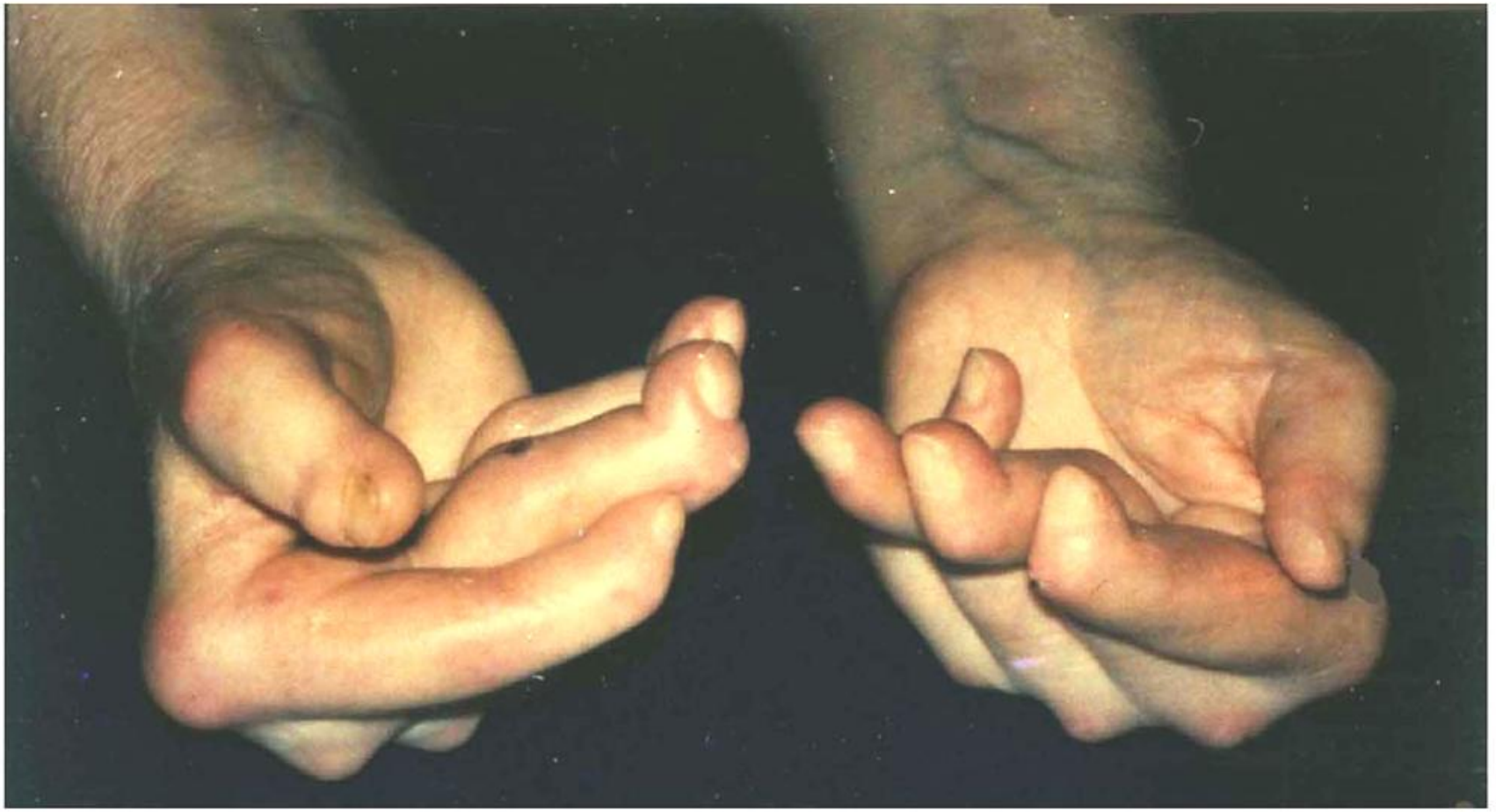


13 days later



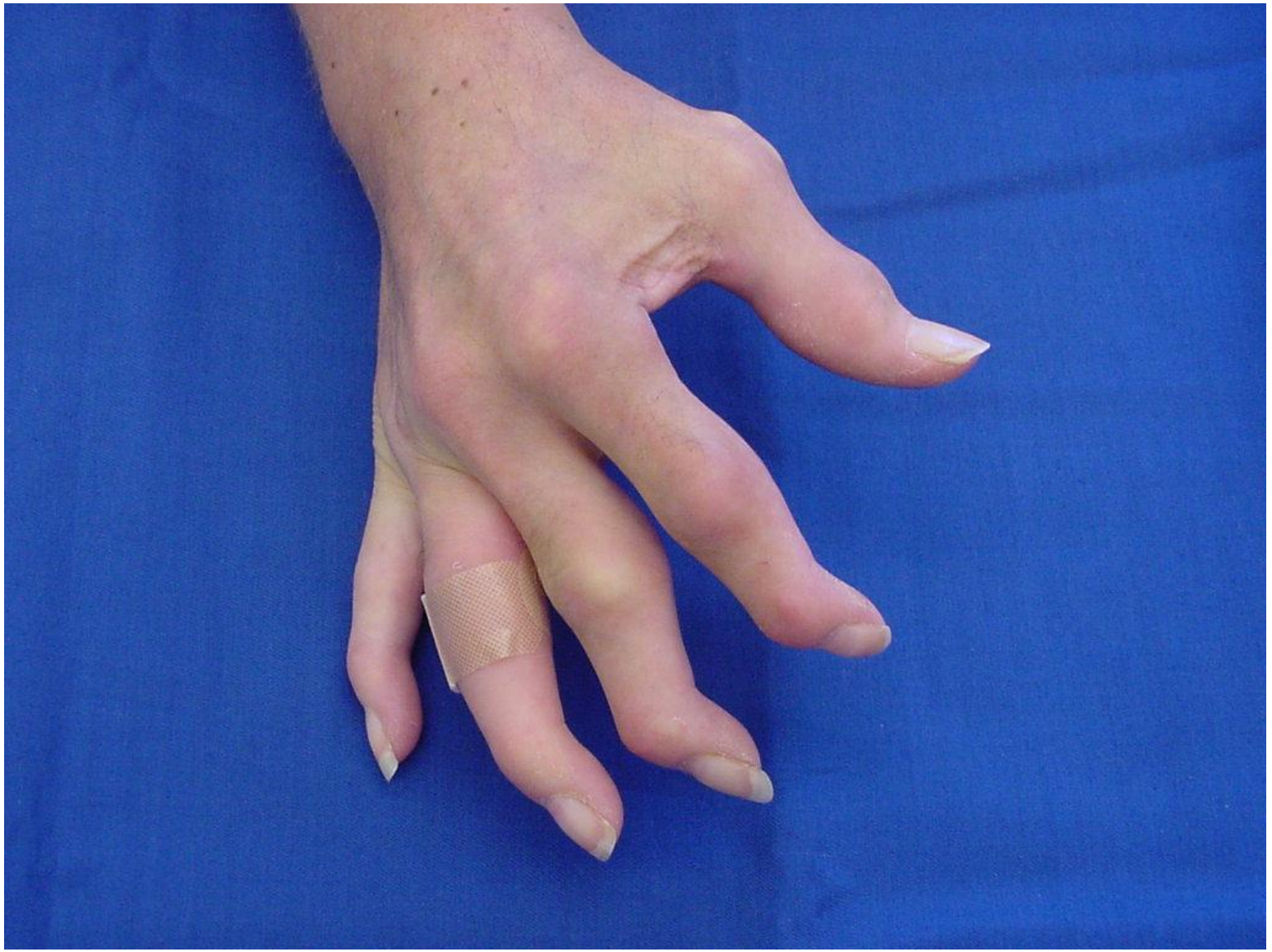
Systemic Targets of Myositis

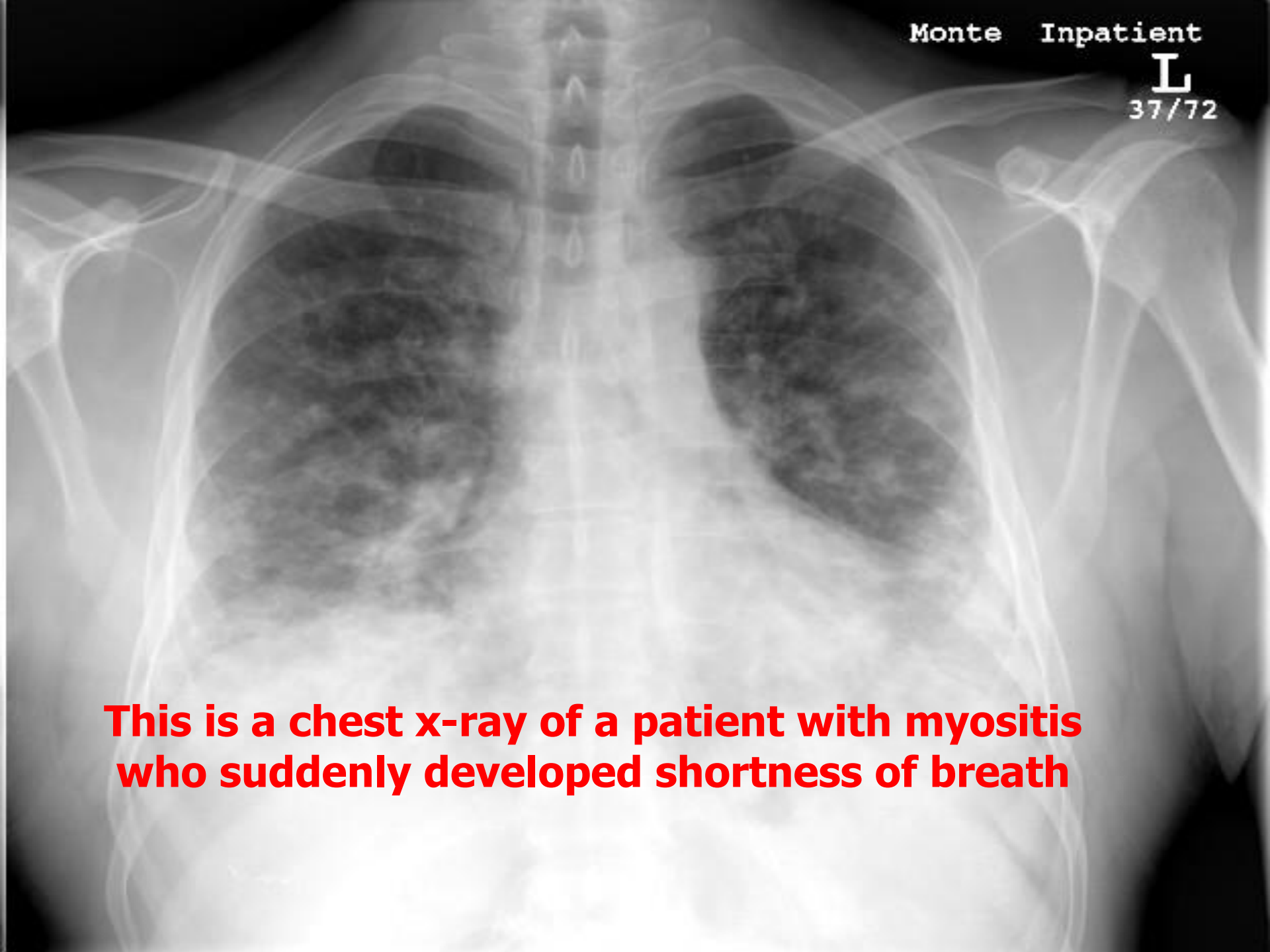
- Skin
- Joint pain (arthritis)



This patient looks like they have rheumatoid arthritis

… but they also have myositis





This is a chest x-ray of a patient with myositis who suddenly developed shortness of breath

Systemic Targets of Myositis

- Skin
- Joint pain (arthritis)
- Lung
  - Shortness of breath
  - Fibrosis (scar tissue)
  - Associated with markers in the blood called antibodies

Different Classifications of Myositis

Clinical groups (Adult or Juvenile)

- Polymyositis
- Dermatomyositis
- Inclusion body
- Myositis with other rheumatic syndromes
- Cancer-associated
- Other
  - eosinophilic
  - granulomatous
  - focal/nodular

Serologic groups (Autoantibodies)

- Myositis-specific
  - Anti-Jo-1 & others (lung)
  - Anti-Mi-2
  - Anti-SRP
- Myositis-associated
  - Anti-PM/Scl (scleroderma)
  - Anti-Ku
  - Anti-U1RNP (mixed CTD)
  - Anti-MJ (JDM)

Systemic Targets of Myositis

- Skin
- Joint pain (arthritis)
- Lung
  - shortness of breath
  - fibrosis (scar tissue)
  - associated with markers in the blood called antibodies
- Gastrointestinal tract
  - difficulty swallowing (dysphagia)
  - ulcerations

How Does Myositis Present Itself?

- In many different ways, developing slowly or quickly
- Weakness - difficulty walking/climbing, combing hair, lifting
- Rashes or skin sores
- Severe fatigue that limits normal activities
- Joint pain or swelling
- Problems with swallowing, reflux, diarrhea or bleeding
- Shortness of breath or cough
- Fevers, sweats or weight loss

So … myositis can present in many ways affecting many parts of the body and, therefore, can mimic many other diseases and be difficult to diagnose

How Do You Diagnose Myositis?

- Careful history and physical examination including tests for muscle weakness
- Blood tests for increased muscle enzymes: CK or CPK, aldolase, LDH, ALT/SGPT, or AST/SGOT
- EMG (electromyography): needle study of muscles
- Muscle biopsy: looking for characteristic pathologic changes in the muscle fibers and blood vessels
  - "immune cells" including lymphocytes
- Skin changes of dermatomyositis (discussed earlier)
- Newer diagnostic approaches: autoantibody testing; MRI; more specialized testing to rule out other diseases that might mimic myositis

Who Gets Myositis (Epidemiology)?

- Rare disease with annual incidence of 5-10 cases/million; possibly increasing
- Prevalence of 50-90 cases/million
- "Bimodal" incidence peaks
  - childhood (5-15 years); adult mid-life (30-50 years)
- Females > Males (2-3:1)
  - African-American women most commonly affected
- IIM subsets
  - overlap CTD: younger females
  - malignancy-associated: age>50, F=M
  - IBM: middle-aged to elderly, F:M~1:3

Questions to Consider in IBM

- What is inclusion body myositis?
- What are the clinical features?
- What is the pathogenesis (i.e. cause) of IBM?
- Is IBM an autoimmune disease?
- How do we treat this disorder?
- Why is it necessary to distinguish IBM from PM?

Inclusion Body Myositis

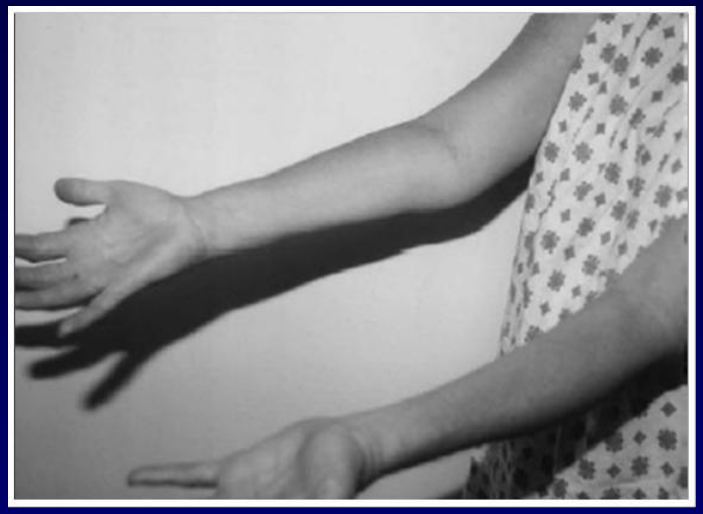
General Features

- Most common acquired muscle disease over the age of 50
- Prevalence of 5-10/million
- Affects men > women at 2-3:1
- Average time from symptom onset to diagnosis is ~ 6 years

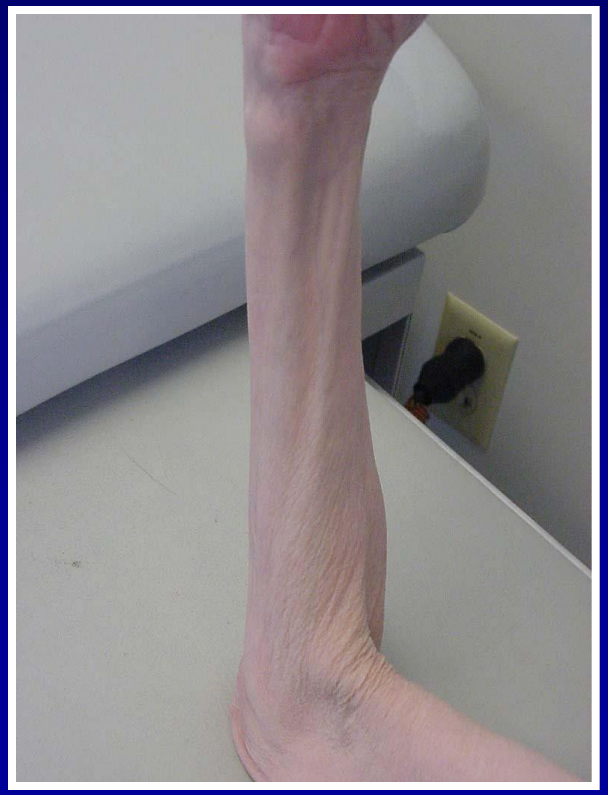
Clinical Features of IBM

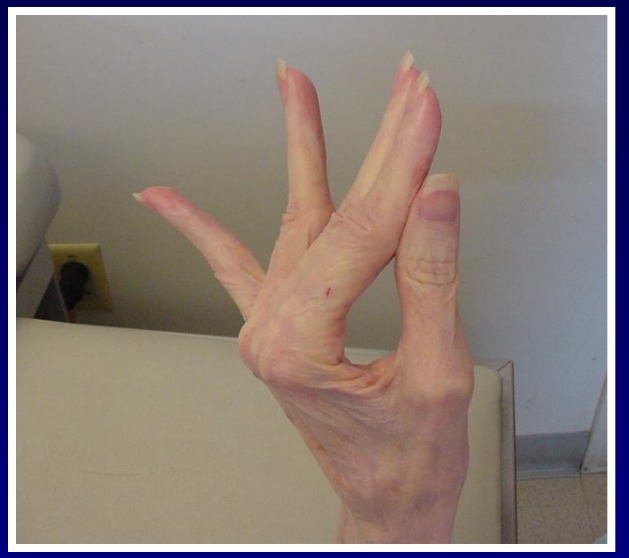
- Consider IBM when confronted with refractory polymyositis patient
- Insidious onset of painless muscle weakness with slow progression
- Tendency to distal (away from the trunk muscles) and asymmetric muscle involvement
- Difficulty swallowing
- Characteristic pattern of muscle atrophy (forearm flexors, quadriceps)

Inclusion Body Myositis



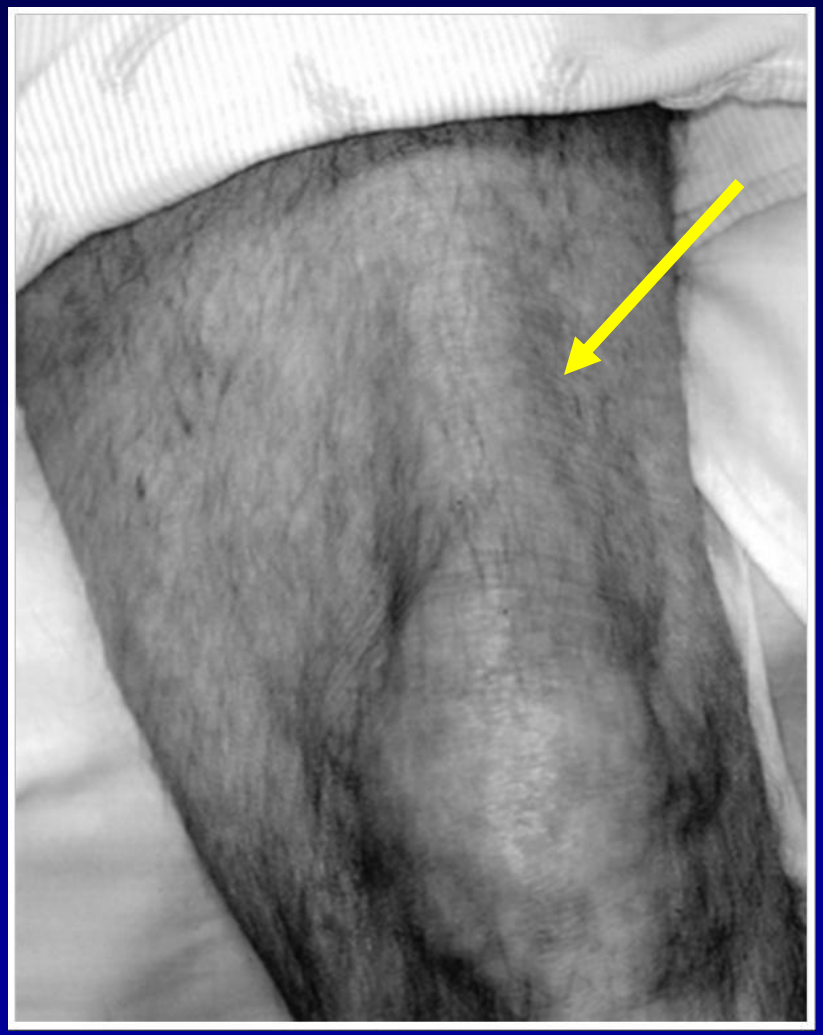
"scooped out" forearm





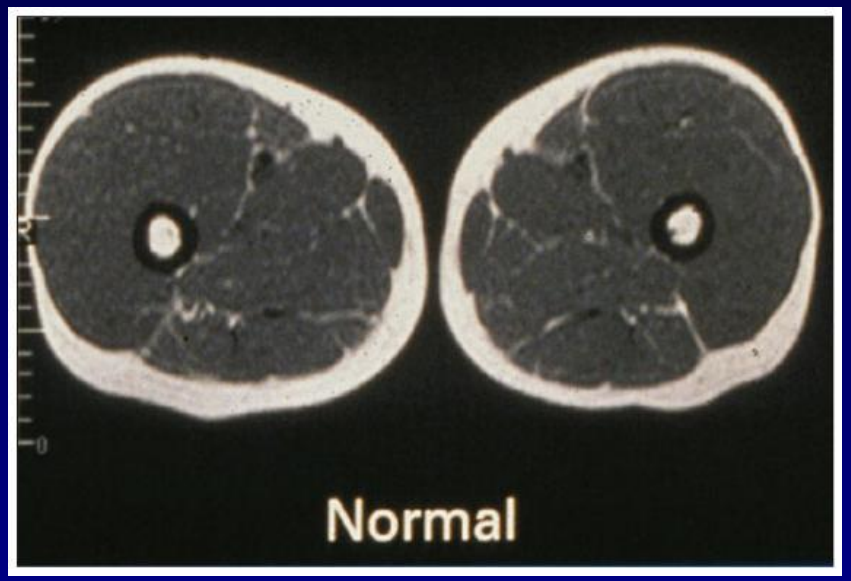
"teardrop sign"

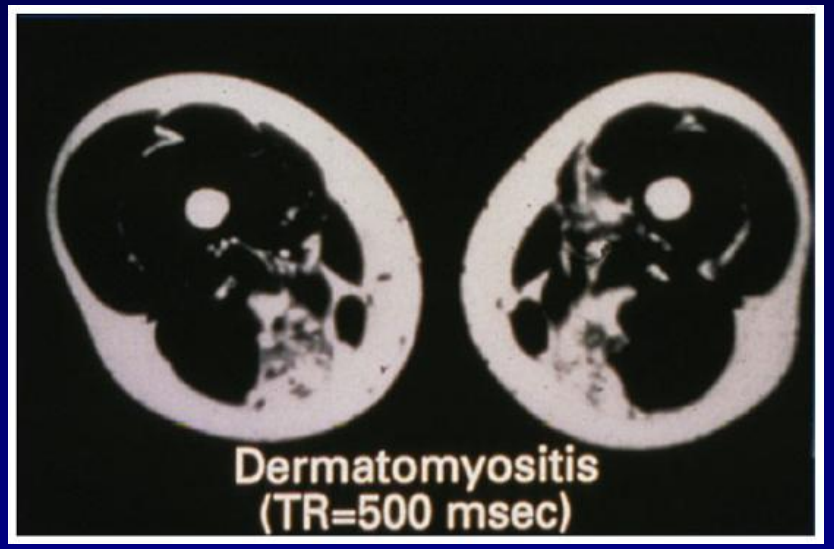
IBM: Quadriceps Atrophy

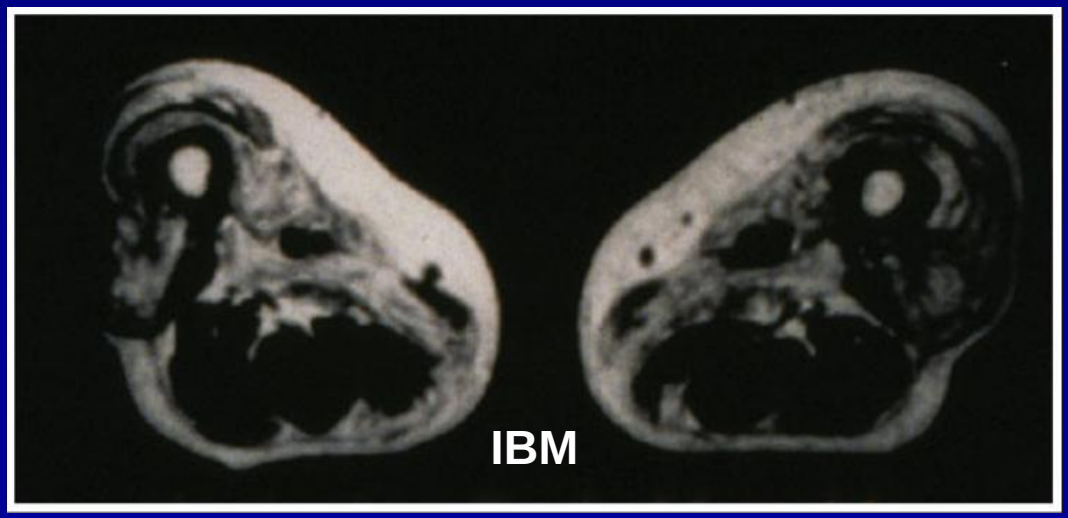


Felice, Medicine, 2001

MRI of Muscle

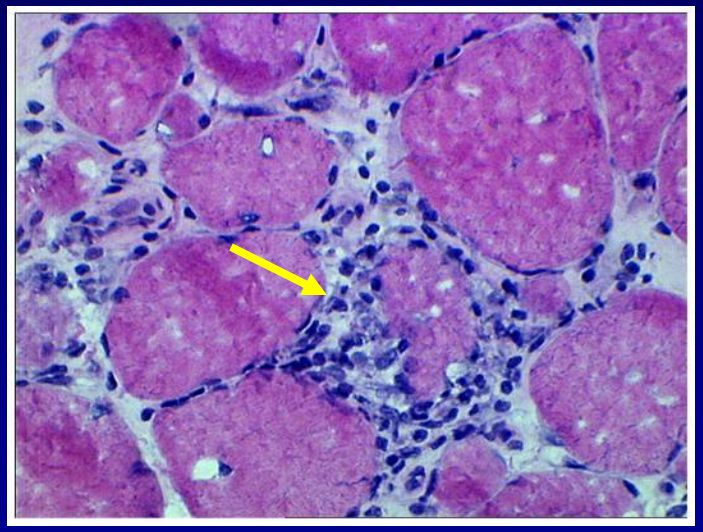


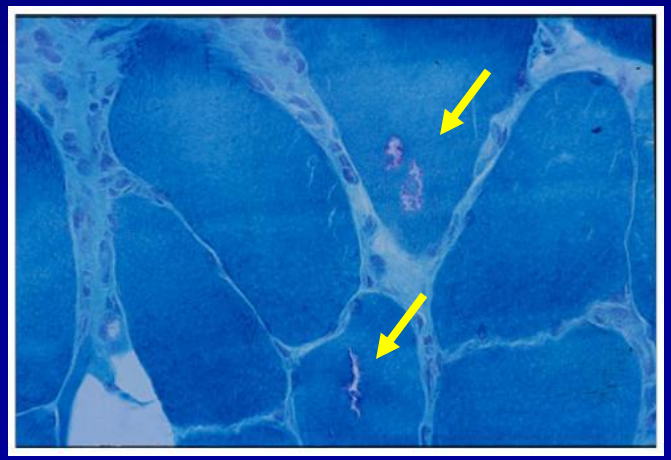




Inclusion Body Myositis: Muscle Pathology

- Distinctive histology:
  - inflammation
  - rimmed vacuoles
    - may be absent in ~20 % of patients with IBM





Questions to Consider in IBM

- What is inclusion body myositis?
- What are the clinical features?
- What is the pathogenesis (i.e. cause) of IBM?
- Is IBM an autoimmune disease?
- How do we treat this disorder?
- Why is it necessary to distinguish IBM from PM?

"Pathogenesis" of IBM

- Cause is unknown
- Evidence for autoimmune/immunologic cause:
  - association with other autoimmune disorders
  - blood tests findings: "autoantibodies"
  - muscle biopsy "resembles" polymyositis

Summary of IBM Cause

Proteins misfold and clump together in muscle tissue

Formation of "inclusion bodies"

These are "toxic" to the muscle cell

Secondary inflammation

Questions to Consider

- What is inclusion body myositis?
- What are the clinical/laboratory features?
- What is the pathogenesis of IBM?
- Is IBM an autoimmune disease?
- How do we treat this disorder?
- Why is it necessary to distinguish IBM from PM?

Difficulties in Assessing Treatment

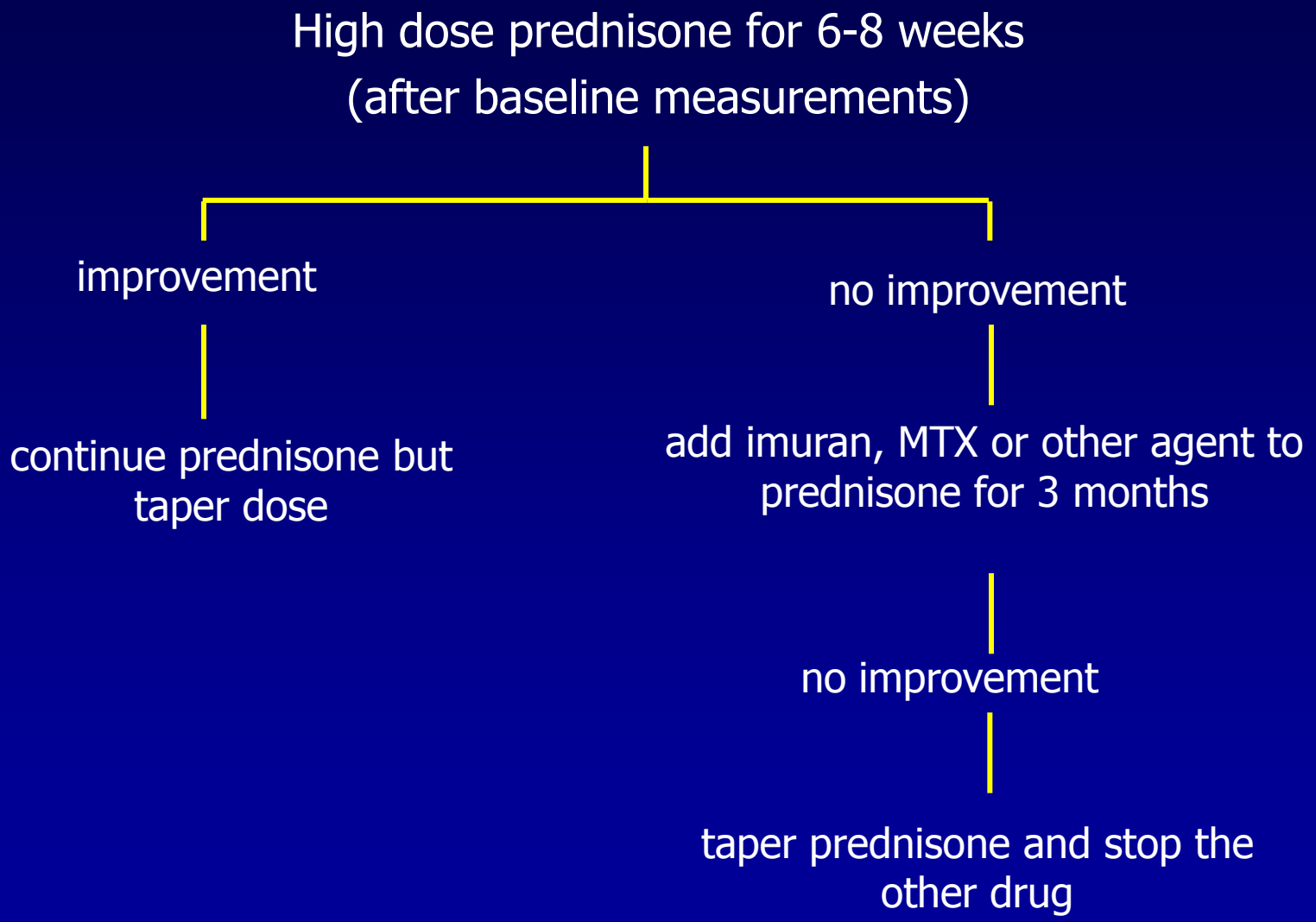
- Rare diseases
- Published reports of treatment may "mix" different type of myositis
  - IBM and PM
- Incorrect diagnosis
  - genetic myopathies
  - toxic myopathies

Treatment Options in Myositis

- Corticosteroids (prednisone)
- Immunosuppressive agents
  - methotrexate
  - azathioprine
  - tacrolimus
  - mycophenolate mofetil
  - cyclosporine
  - cyclophosphamide
- IVIg
- Anti-TNF agents (etanercept, infliximab)
- Rituximab (depletes B cells)

- Oxandrolone (IBM)
- Other (stem cell transplant)
- Combination regimens

Approach to IBM Therapy



Unanswered Questions in Myositis

- How to predict those patients who need more aggressive therapy?
- How can we develop newer therapies that are adequately studied?
- What are the factors that cause and sustain myositis?
  - Genetic factors
  - Environmental risks
- How do we make the public aware that this disease deserves the same investigative efforts that other autoimmune diseases receive