Dermatomyositis

Dermatomyositis is an idiopathic inflammatory myopathy, with characteristic cutaneous findings, that occurs in children and adults. This systemic disorder most frequently affects the skin and muscles but may also affect the joints, the esophagus, the lungs, and, less commonly, the heart. Calcinos is a complication of dermatomyositis that is observed most often in children and adolescents.

**Signs and symptoms**

Persons with dermatomyositis often present with skin disease as one of the initial manifestations, and it may be the sole manifestation at onset in perhaps as many as 40% of individuals with this condition. Cutaneous involvement may manifest as follows:

- Eruption on exposed surfaces
- Pruritis of skin lesions, sometimes intense enough to disturb sleep
- Scaly scalp or diffuse hair loss

Muscle disease may occur concurrently, may precede the skin disease, or may follow the skin disease by weeks to years. Muscle involvement manifests as the following:

- Proximal muscle weakness
- Muscle fatigue/weakness when climbing stairs, walking, rising from a seated position, combing hair, or reaching for items above shoulders
- Muscle tenderness: May occur but not regular feature of dermatomyositis
Systemic manifestations that may occur include the following:

- Arthralgia, arthritis
- Dyspnea
- Dysphagia
- Arrhythmia
- Dysphonia
- Malignancy, particularly in older patients

Children also commonly develop a tiptoe gait secondary to flexion contracture of the ankles in early childhood and may have extramuscular manifestations, such as the following:

- General systemic disturbances, fever, arthralgia, malaise, weight loss, Raynaud phenomenon
- Dysphagia, similar to that of scleroderma
- Atrioventricular defects, tachyarrhythmias, dilated cardiomyopathies
- Gastrointestinal ulcers and infections
- Contracture of joints
- Pulmonary involvement due to weakness of thoracic muscles, interstitial lung disease
- Subcutaneous calcification

**Pathophysiology**

Dermatomyositis is considered to be the result of a humoral attack against the muscle capillaries and small arterioles (endothelium of the endomysial blood vessels). Since 1966, there has been evidence supporting an ongoing microangiopathy.
The disease starts when putative antibodies or other factors activate C3, forming C3b and C4b fragments that lead to formation of C3bNEO and membrane attack complex (MAC), which are deposited in the endomysial vasculature. Complement C5b-9 MAC is deposited and is needed in preparing the cell for destruction in antibody-mediated disease. B cells and CD4 (helper) cells are also present in abundance in the inflammatory reaction associated with the blood vessels.

As the disease progresses, the capillaries are destroyed, and the muscles undergo microinfarction. Perifascicular atrophy occurs in the beginning; however, as the disease advances, necrotic and degenerative fibers are present throughout the muscle.

The pathogenesis of the cutaneous component of dermatomyositis is poorly understood.

Studies on the pathogenesis of the muscle component have been controversial. Some suggest that the myopathy in dermatomyositis is pathogenetically different from that in polymyositis. The former is probably caused by complement-mediated (terminal attack complex) vascular inflammation, the latter by the direct cytotoxic effect of CD8+ lymphocytes on muscle. However, other cytokine studies suggest that some of the inflammatory processes may be similar. One report has linked tumor necrosis factor (TNF) abnormalities with dermatomyositis.

**Etiology**

The cause of dermatomyositis is unknown; however, the following factors have been implicated.
A genetic component may predispose to dermatomyositis. Dermatomyositis rarely occurs in multiple family members. However, a link to certain human leukocyte antigen (HLA) types (eg, DR3, DR5, DR7, may exist. Polymorphisms of tumor necrosis factor may be involved; specifically, the presence of the -308A allele is linked to photosensitivity in adults and calcinosis in children.

Immunologic abnormalities are common in patients with dermatomyositis. Patients frequently have circulating autoantibodies. Abnormal T-cell activity may be involved in the pathogenesis of both the skin disease and the muscle disease. In addition, family members may manifest other diseases associated with autoimmunity.

Antinuclear antibodies (ANAs) and antibodies to cytoplasmic antigens (ie, antitransfer RNA synthetases) may be present. Although their presence may help to define subtypes of dermatomyositis and polymyositis, their role in pathogenesis is uncertain.

Infectious agents, including viruses (eg, coxsackievirus, parvovirus, echovirus, human T-cell lymphotropic virus type 1 [HTLV-1], HIV) and Toxoplasma and Borrelia species, have been suggested as possible triggers of dermatomyositis.

Several cases of drug-induced dermatomyositis have been reported. Dermatomyositis-like skin changes have been reported with hydroxyurea in patients with chronic myelogenous leukemia or essential thrombocytosis. Other agents that may trigger the disease include penicillamine, statin drugs, quinidine, and phenylbutazone.
Dermatomyositis may be initiated or exacerbated by silicone breast implants or collagen injections, but the evidence for this is anecdotal and has not been verified in case-control studies. One report detailed HLA differences among women in whom inflammatory myopathy develops after they received silicone implants.

Epidemiology

The estimated incidence of dermatomyositis is 9.63 cases per million population. The estimated incidence of AMD is 2.08 cases per million.

Dermatomyositis can occur in people of any age. Two peak ages of onset exist: in adults, the peak age of onset is approximately 50 years, whereas in children, the peak age is approximately 5-10 years. Dermatomyositis and polymyositis are twice as common in women as in men. Neither condition shows any racial predilection.

Prognosis

Most patients with dermatomyositis survive, in which case they may develop residual weakness and disability. Children with severe dermatomyositis may develop contractures. The disease may spontaneously remit in as many as 20% of affected patients. About 5% of patients have a fulminant progressive course with eventual death. Therefore, many patients require long-term therapy. Patients with dermatomyositis who have malignancy, cardiac involvement, or pulmonary involvement or who are elderly (ie, > 60 years) have a poorer prognosis.
Dermatomyositis may cause death because of muscle weakness or cardiopulmonary involvement. Patients with an associated malignancy may die of the malignancy.

Calcinosis may complicate dermatomyositis. It is very rare in adults but is more common in children and has been linked to delay in diagnosis and to less-aggressive therapy. Contractures can occur if the patient is immobile.

**Clinical Presentation**

**History**

Persons with dermatomyositis often present with skin disease as one of the initial manifestations. In perhaps as many as 40% of individuals with dermatomyositis, the skin disease is the sole manifestation at onset. Muscle disease may occur concurrently, may precede the skin disease, or may follow the skin disease by weeks to years.

Muscle involvement manifests as proximal muscle weakness. Affected patients often begin to note muscle fatigue or weakness when climbing stairs, walking, rising from a sitting position, combing their hair, or reaching for items in cabinets that are above their shoulders. Muscle tenderness may occur but is not a regular feature of dermatomyositis.

Systemic manifestations may occur; therefore, the review of systems should assess for the presence of arthralgia, arthritis, dyspnea, dysphagia, arrhythmia, and dysphonia.

Malignancy is possible in any adult patient with dermatomyositis, but it is more common in adults older
than 60 years. Only a handful of children with dermatomyositis and malignancy have been reported, and malignancy does not appear to be over-represented in the pediatric (ie, < 16 years) population.

A thorough history, review of systems, and assessment for previous malignancy should be performed in all patients with dermatomyositis to aid in evaluation for an associated malignancy. In the pediatric population, no further screening is recommended, whereas in the adult population, most experts support a thorough search for malignancy with age-related malignancy screening as well as blind imaging to rule out underlying malignancy.

Dermatomyositis in children is characterized by muscle weakness and resembles the adult form of the disease. Children commonly develop a tiptoe gait secondary to flexion contracture of the ankles in early childhood. Children tend to have extramuscular manifestations, especially gastrointestinal (GI) ulcers and infections, more frequently than adults. Extramuscular manifestations of the disease may include the following:

- General systemic disturbances, fever, arthralgia, malaise, weight loss, Raynaud phenomenon
- Dysphagia
- Gastroesophageal reflux
- Atrioventricular defects, tachyarrhythmias, dilated cardiomyopathies
- GI ulcers and infections
- Contracture of joints
- Pulmonary involvement due to weakness of thoracic muscles, interstitial lung disease
Na et al found the frequency of subcutaneous calcifications to be significantly higher in juvenile dermatomyositis than adult dermatomyositis.

Several reports describe drug-induced dermatomyositis or existing dermatomyositis exacerbated by certain drugs, including statins and interferon therapy. Consequently, a medication history should be elicited in all patients.

**Physical Examination**

Dermatomyositis is a disease that primarily affects the skin and the muscles, but may also affect other organ systems. The possibly pathognomonic cutaneous features of dermatomyositis are a heliotrope rash and Gottron papules.

The heliotrope rash consists of a violaceous to erythematous rash, with or without edema, in a symmetrical distribution involving the periorbital skin (see the image below). Sometimes this sign is subtle and may consist of only a mild discoloration along the eyelid margin. Similar to other areas, scale may be present on the eyelids. A heliotrope rash is rarely observed in other disorders; therefore, its presence is highly suggestive of dermatomyositis.

Gottron papules are flat-topped, erythematous to violaceous papules and plaques found over bony prominences, particularly the metacarpophalangeal joints, the proximal interphalangeal joints, and/or the distal interphalangeal joints. See the image below. They
may also be found overlying the elbows, the knees, and/or the feet. A slight scale overlying the papules may be present, and, occasionally, a thick psoriasiform scale is observed. Gottron papules may clinically resemble lesions of lupus erythematosus; lichen planus; or, particularly in the event of psoriasiform scaling, psoriasis.

Characteristic but not pathognomonic features include the following:

- Malar erythema
- Poikiloderma in a photosensitive distribution
- Violaceous erythema on the extensor surfaces
- Periungual and cuticular changes

Poikiloderma, which consists of erythema, hypopigmentation, hyperpigmentation, and telangiectasias, may occur on photoexposed skin, such as the extensor surfaces of the arm; the upper chest, in a "V-neck" configuration (see the image below); the upper back (shawl sign); or the lateral thighs (holster sign).

Patients often notice an eruption on photoexposed surfaces. The disease is often pruritic, and, sometimes, intense pruritus may disturb sleep patterns. Patients may also complain of a scaly scalp or diffuse hair loss.

Dilated capillary loops at the base of the fingernail are characteristic of dermatomyositis. Dropout of nailfold capillaries is also seen, along with cuticular hypertrophy and ragged cuticles. In patients with mechanic's hands, the palmar and lateral surfaces of the fingers may become rough and cracked. Mechanic's hands are linked
to an increased risk of pulmonary disease as part of the anti-synthetase syndrome.

The above-mentioned pathognomonic and characteristic cutaneous lesions typically demonstrate interface dermatitis on histopathology. Other cutaneous lesions have been described in patients with dermatomyositis that do not reflect these interface changes. These include panniculitis (see the following image) and urticaria, as well as hyperkeratosis of the lateral palms and digits known as mechanic's hands, which has been associated with anti-synthetase antibodies.

Other rare skin findings include the following:

- Cutaneous mucinosis
- Follicular hyperkeratosis
- Hyperpigmentation
- Ichthyosis
- White plaques on the buccal mucosa
- Cutaneous vasculitis
- Flagellate erythema
- Diffuse subcutaneous edema
- Vesiculobullous or erosive lesions
- Exfoliative erythroderma

Children with dermatomyositis may have an insidious onset that hides the true diagnosis until the dermatologic disease is clearly observed and diagnosed. Calcification is a complication of juvenile dermatomyositis (see the image below), but it is rarely observed at the onset of disease. The prognosis in children with dermatomyositis is

Muscle disease commonly manifests as a proximal symmetrical muscle weakness. The degree of weakness
may range from mild to moderate to severe; sometimes, quadriparesis is observed. Patients may have difficulty rising from a chair or squatting and then raising themselves from this position. Sometimes, in an effort to rise, patients use other muscles that are not as affected.

Testing of muscle strength is part of each patient assessment. Often, the extensor muscles of the arms are more affected than the flexor muscles. Distal strength is almost always maintained. Neck flexor weakness may also be seen.

Muscle pain and tenderness may be observed early in the course of the disease; muscle tenderness is a variable finding. Sensation is normal, and tendon reflexes are preserved unless the muscle is severely weak and atrophic.

Other systemic features include joint swelling, changes associated with Raynaud phenomenon, and abnormal findings on cardiopulmonary examination. When joint swelling occurs, the small joints of the hands are the most frequently involved. The arthritis associated with dermatomyositis is non-deforming. Patients with pulmonary disease may have abnormal breath sounds. Patients with an associated malignancy may have physical findings relevant to the affected organs.

**Diagnosis**

Examination for cutaneous dermatomyositis may reveal the following findings:

- Characteristic, possibly pathognomonic cutaneous features: Heliotrope, Gottron papules
Characteristic but not pathognomonic features:
Malar erythema, poikiloderma in a photosensitive distribution, violaceous erythema on the extensor surfaces, and periungual and cuticular changes

Flat, red rash involving the face and upper trunk or other body surfaces, including knees, elbows, neck, anterior chest (v sign), or back and shoulders (shawl sign)

Examination for muscle disease in dermatomyositis may demonstrate the following:

- Quadriplegia
- Extensor muscles sometimes more affected than the flexor muscles
- Distal strength, sensation, and tendon reflexes maintained (unless severely weak and atrophic muscle)

**Testing**

Laboratory and other studies that may be helpful include the following:

- Muscle enzyme levels (eg, creatine kinase, aldolase, aspartate aminotransferase, lactic dehydrogenase)
- Myositis-specific antibodies
- Antinuclear antibody levels
- Pulmonary function studies
- Electrocardiography

**Imaging studies**

The following imaging studies may be used in the evaluation of dermatomyositis:
• MRI
• Chest radiography
• Barium swallow
• Ultrasonography of the muscles
• Electromyography
• CT scanning

Procedures

The following procedures may be helpful in the evaluation of dermatomyositis:

• Skin biopsy
• Muscle biopsy (open or via a needle): Findings can be diagnostic (perivascular and interfascicular inflammatory infiltrates with adjoining groups of muscle fiber degeneration/regeneration)
• Esophageal manometry

Diagnostic Considerations

The differential diagnoses listed are for cutaneous disease.

Differential Diagnoses

• Discoid Lupus Erythematosus
• Graft Versus Host Disease
• Lichen Myxedematosus
• Lichen Planus
• Multicentric Reticulohistiocytosis
• Parapsoriasis
• Pityriasis Rubra Pilaris
• Polymorphous Light Eruption
Psoriasis
Rosacea
Sarcoidosis
Subacute Cutaneous Lupus Erythematosus (SCLE)
Systemic Lupus Erythematosus (SLE)
Tinea Corporis

Approach Considerations

The workup for dermatomyositis may include selected laboratory tests and diagnostic imaging (eg, magnetic resonance imaging [MRI], chest radiography, ultrasonography, electromyography [EMG], or computed tomography [CT]), as well as muscle and skin biopsy and other tests as appropriate.

In adult patients with dermatomyositis, assessment for malignancy should be performed upon initial diagnosis and repeated at least annually for 3 years. The risk of malignancy increases with age. The exact testing order should be based on the patient's sex, age, and race; however, testing beyond age-appropriate screening is most often recommended.

Laboratory Studies

Muscle enzyme levels are often abnormal during the course of dermatomyositis, except in patients with amyopathic dermatomyositis (ADM). The most sensitive/specific enzyme is elevated creatine kinase (CK), but aldolase studies and other tests (eg, for aspartate aminotransferase [AST] or lactic dehydrogenase [LDH]) may also yield abnormal results.
At times, the elevation of the enzymes precedes the appearance of clinical evidence of myositis. Thus, if a patient who is presumably stable develops an elevation of an enzyme that was previously within the reference range, the clinician should assess the possibility of a flare of the muscle disease.

Several serologic abnormalities have been identified and may be helpful in the classification of subtypes for prognosis, but they are not used for routine diagnosis. As a group, these antibodies have been termed myositis-specific antibodies (MSAs). These autoantibodies occur in about 30% of all patients with dermatomyositis or polymyositis.

A positive antinuclear antibody (ANA) finding is common in patients with dermatomyositis, but is not necessary for diagnosis.

**Imaging Studies**

MRI may be useful in assessing for the presence of an inflammatory myopathy in patients without weakness. It can assist in differentiating steroid myopathy from continued inflammation and may serve as a guide in selecting a muscle biopsy site. Ultrasonography of the muscles has also been suggested for evaluation but has not been widely accepted.

Electromyography (EMG) is a means of detecting muscle inflammation and damage and has, at times, been useful in selecting a muscle biopsy site. Since the introduction of muscle MRI, EMG has been obtained less commonly in this setting.
A barium swallow allows evaluation of esophageal dysmotility.

CT scanning of the chest, abdomen, and pelvis is useful in the evaluation of potential malignancy that might be associated with dermatomyositis.

Transvaginal ultrasonography of the pelvis is particularly important for malignancy screening in women, given the strong association between ovarian cancer and dermatomyositis. Mammography is also useful in women for the evaluation of a potential malignancy.

**Other Studies**

Other tests may include the following:

- Muscle biopsy
- Pulmonary function studies with diffusion capacity
- Electrocardiography (ECG)
- Esophageal manometry (in selected patients)
- Age-related colonoscopy and fecal-occult blood testing for malignancy screening
- Papanicolaou smear in women for malignancy screening
- Cancer antigen 125 (CA-125) and CA-19-9 for malignancy screening

Muscle biopsy, either open or via needle, may enhance the clinician's ability to diagnose dermatomyositis. The biopsy results may be useful in differentiating steroid myopathy from active inflammatory myopathy when patients have been on corticosteroid therapy but are still weak.
Histologic Findings

Skin biopsy reveals an interface dermatitis that is difficult to differentiate from lupus erythematosus. Vacuolar changes of the columnar epithelium and lymphocytic inflammatory infiltrates at the dermal-epidermal junction basement membrane can occur. Mucin deposition in the dermis is also characteristic.

Findings on muscle biopsy can be diagnostic. Muscle biopsy in patients with dermatomyositis reveals perivascular and interfascicular inflammatory infiltrates with adjoining groups of muscle fiber degeneration/regeneration.

This contrasts with polymyositis infiltrates, which are mainly intrafascicular (endomysial inflammation) with scattered individual muscle fiber necrosis.

Although inflammation is the histologic hallmark of dermatomyositis, polymyositis, and inclusion-body myositis, dermatomyositis is the only 1 of the 3 that shows perifascicular atrophy. In addition, many fibers undergo degeneration and necrosis that cause them to lose their staining ability; therefore, they are termed ghost fibers. When these changes are associated with collections of inflammatory cells around the blood vessels, the diagnosis of dermatomyositis is certain.

Approach Considerations

Therapy for dermatomyositis involves both general measures and specific measures to control the muscle disease and the skin disease. In addition, some patients
with dermatomyositis need treatment for other systemic manifestations or complications.

The muscle component is treated by administering corticosteroids, typically with an immunosuppressive agent. The skin disease is treated by avoiding sun exposure and by using sunscreens and photoprotective clothing, as well as with topical corticosteroids, antimalarial agents, and immunomodulatory medications such as methotrexate, mycophenolate mofetil, or intravenous immunoglobulin.

Surgical care is usually unnecessary in the management of dermatomyositis. Some patients may benefit from surgical removal of focal areas of calcinosis, particularly those that are painful. Inpatient care is needed for patients with fulminant dermatomyositis with muscle and/or internal organ involvement.

Children and adolescents are much more prone to the development of calcinosis. Aggressive and early treatment may prevent this complication.

**General Measures**

Several general measures are helpful in the care of patients with dermatomyositis. Bed rest is often valuable for those with severe inflammation of the muscles.

In patients with muscle weakness, especially children, a program of physical therapy is useful to help prevent the contractures that can complicate the disease when patients do not fully move their joints. Rehabilitative exercise is also recommended for both adult and
pediatric patients in order to maintain muscle strength, even during the course of active muscle disease.

For patients with dysphagia and/or gastroesophageal reflux, elevation of the head of their bed and avoidance of eating prior to bedtime are helpful. These simple maneuvers may prevent aspiration pneumonitis. Occasionally, nasogastric tube feeding is needed to increase caloric input.

**Management**

Therapy for the muscle component of dermatomyositis involves the use of corticosteroids, with or without an immunosuppressive agent. The skin disease is treated with sun avoidance, sunscreens, topical corticosteroids, antimalarial agents, methotrexate, mycophenolate mofetil, or immunoglobulin.

**Pharmacotherapy**

Medications used in the management of dermatomyositis include the following:

- **Corticosteroids (eg, prednisone):** Prednisone is a first-line therapy for dermatomyositis
- **Immunosuppressive agents (eg, methotrexate, azathioprine, mycophenolate mofetil, sirolimus, rituximab)**
- **Immune globulins (eg, IV immune globulin)**
- **Calcium channel blockers (eg, diltiazem)**
- **Antimalarial agents (eg, hydroxychloroquine)**
In addition to the agents listed above, colchicine, alendronate, and warfarin have been shown to be potentially beneficial for the treatment of calcinosis.

Nonpharmacotherapy

General therapeutic measures may include the following:

- Bed rest
- Physical therapy and rehabilitative measures
- Sun avoidance
- Sun-protective measures (e.g., broad-spectrum sunscreens)
- Elevation of head of bed
- Avoidance of eating before bedtime

Surgery

Surgical care is usually unnecessary in the management of dermatomyositis. However, some patients may request surgical removal of local areas of calcinosis.

Treatment of Muscle Disease

- Methotrexate
- Azathioprine
- Cyclophosphamide
- Cyclosporine
- Mycophenolate mofetil
- Leflunomide
- Chlorambucil
Treatment of Skin Disease

Therapy of cutaneous disease of dermatomyositis is often difficult. Some patients with dermatomyositis present primarily with skin disease (ie, amyopathic dermatomyositis [ADM]), whereas others present with a muscle component that is controlled but with significant ongoing skin disease.

First-line therapy is to recognize that the patient is photosensitive and to prescribe sun avoidance and sun protection measures, including broad-spectrum sunscreens and photoprotective clothing. The cutaneous component of dermatomyositis is exacerbated by sunlight and other sources of ultraviolet light; in addition, the muscle component may be exacerbated.

Hydroxychloroquine and chloroquine, Methotrexate, Intravenous immune globulin (IVIG)

Management of Calcinosis

Calcinosis, a complication of dermatomyositis, is particularly likely to affect children and adolescents. Some experts believe that aggressive early treatment of the myositis may aid in preventing calcinosis. Once established, the process of calcinosis is debilitating in many patients. Although spontaneous remission is possible, it often takes many years to occur.

Diet and Activity

A well-balanced diet is useful. Patients with severe muscle inflammation may need extra protein to balance their loss. Patients with dysphagia should avoid eating
before bedtime; they may require a special diet, depending on the severity of the esophageal dysfunction.

Sun avoidance and sun protection measures are recommended in patients with skin lesions. Patients with dermatomyositis should maintain activity as much as possible. Although vigorous physical training should be avoided when the myositis is active, a rehabilitative exercise regimen is typically still recommended during the course of active muscle disease. Exercises to maintain the patient's range of motion are also advised.

Resistance training and aerobic exercise may also be beneficial for muscle involvement, especially if instituted early. Resistive home exercise, range of motion exercises.

**Consultations**

Consultations with the following specialists may be indicated:

- Rheumatologist
- Dermatologist
- Neurologist
- Medical or surgical oncologist (for patients with cancer)
- Internal medicine specialist or pediatrician (depending on patient age)
- Pulmonologist
- Cardiologist
- Gastroenterologist
Long-Term Monitoring

Disease activity must be closely monitored. Repeat measurements of muscle enzymes and clinical assessment of patients' strength may facilitate assessment of the activity of the myositis. Machines that can aid in the quantification of strength are available but are not used widely.

Annual physical examinations are useful to monitor for potential toxicity due to therapy or for the presence of a malignancy.

Malignancy evaluations, including imaging studies as noted above, should be conducted annually for at least the first 3 years after diagnosis. A report by Hill et al suggested that the risk of malignancy never returns to baseline, even after 3 years; thus, continued vigilance is warranted.

Selection of testing should be based on the patient's age, sex, race, and other symptoms or findings. Typically, a workup more extensive than age-appropriate screening is recommended. The principal malignancies associated with dermatomyositis are ovarian cancer and breast cancer in females and lung cancer in males. After 3-5 years, patients should be monitored in the same manner as any other person of their same age, race, and sex.

Physical Therapy Management (current best evidence)

Preferred Practice Patterns for Physical Therapy:
Impaired Joint Mobility, Motor Function, Muscle Performance, and Range of Motion Associated with Connective Tissue Dysfunction.

Impairments/ Skin Involvement Into Fascia, Muscle, or Bone and Scar Formation

**Focus of Treatment should include:** Patient education on joint preservation

- Strengthening to prevent atrophy once inflammation is controlled
- Range of motion exercises to prevent contractures
- Passive stretching and splinting

**Stress management:**

- Meditation
- Yoga

**Diet Changes:**

- diet high in fiber (if large amount of muscle damage has occurred)
- low-fat

Avoidance of sun and increased use of sunscreen has shown to decrease skin symptoms.

Physical therapy and individually approved exercise programs are becoming important parts of standard myositis treatment plans. Doctors recognize the value of these programs to improve physical activity, quality of life, and to reduce disability.

Even a modest increase in daily activity can provide benefits. Find an activity or exercise that is both
appropriate for your own level of function and enjoyable for you - for example, walking, gardening, resistance training, or swimming. Exercises can easily be adapted as needed. Always check with your doctor or therapist to be sure the program is right for you.

Some general guidelines when exercising:

- Warm up. This gradually increases blood flow and heart rate.
- Exercise to a rate of exertion that you find somewhat challenging but not overly difficult.
- Cool down to allow your body to gradually recover.

Do not continue exercises if you experience severe pain or have uncontrolled high blood pressure or irregular heart beat.

If you're looking for a set of exercises applicable to everyone with myositis, you won't find it. "Every patient is different," says Michael Harris-Love, DSc, "and the same patient is even different from day to day." Physical therapists can help.

Physical therapists will ask what you do in the course of a day. Taking care of a home, garden or children require a good deal of physical activity, and therapists determine what you need to do to continue these activities and what can be added to these normal routines to provide therapeutic benefits.

Some tips:

- Start slowly and gradually build up.
- Err on the side of caution-if you feel you might be overdoing it, step back.
- Don't get discouraged. You will likely have good days and bad days. Develop a routine you can do on both.
- Work out with a partner.

Rehabilitation specialists recommend aquatherapy for patients with muscle disease.

**Diet, exercise and over-the-counter inflammation reducers**

**Exercise training has beneficial effect on systemic inflammation**

**Exercise training in children**

**Training Protocol**

The resistance exercise training protocol. Briefly, patients underwent a supervised resistance exercise training regimen with an intensity of 10 voluntary repetition maximum (VRM) 3 d/wk for 7 wks. The training involved five muscles groups (deltoid, quadriceps, latissimus dorsi/biceps, gastrocnemius and trunk muscles) 3 d/wk for 7 wks.

**EFFECT OF EX'S ON DERMATOMYOSITIS**

Exercise training has beneficial effects on systemic inflammation, as determined by a reduction in selective serum markers such as IL-6, C-reactive protein and TNF in healthy individuals.
However, little is known about the effects of exercise training on inflammation in patients suffering from chronic inflammatory disorders.

- **Resistance Exercise modulated the expression of genes involved in inflammation, fibrosis and metabolism in muscle from polymyositis/dermatomyositis patients.** -

- **Performance in polymyositis/dermatomyositis patients without disease exacerbation by positively modulating genes involved in the disease process.**

- **Resistance Exercise Downregulated Proinflammatory and Upregulated Antiinflammatory Genes**

- **Resistance Exercise Downregulated Profibrotic, Upregulated Antifibrotic Genes and Reduced Tissue Fibrosis**

- **Resistance Exercise Upregulated Genes Involved in Oxidative Metabolism and Downregulated Genes Involved in Lipid Biosynthesis**

The Effects of Physical Exercise Shortly on an Acute Episode of Dermatomyositis/ found that:

- Physical training begun 2-3 weeks after an acute exacerbation of DM seems to be safe and useful.
- Muscle atrophy, due to lack of activity, may be partially prevented.
- Level of disability can be decreased.
DM patients on the benefits of intensive aerobic training it was found that:

- Blood lactate levels were normal before and after treatment.
- There was improvement in strength, balance, performance in activities of daily living, and walking speed.

**Types of Exercises**

Exercise programs should be based on your individual prescription and tailored to your ability, the therapist may include the following:

- **Balance, coordination, and agility training**, which includes posture awareness and task-specific training
- **Aerobic endurance conditioning**, which can be done through swimming, class-based exercises, dance, Tai Chi (also good for balance training) and by using equipment like stationery bikes, elliptical machines, and arm bikes
- **Strength training**, which might include active, active-assisted, and resistance exercises
- **Non-aerobic**, might include the use of free weights, hand strengthening exercises (squeezing putty or a gripper), functional exercises (sit-to-stand training, reaching for weights on multi-level shelving) weight machines, and thera-bands
- **Flexibility exercises**, such as muscle lengthening, range of motion, and stretching
- **Relaxation/respiratory training** helps to patients use diaphragmatic breathing in various positions to
help strengthen this muscle and to learn to use movement more efficiently during exercise, transfers from bed to chair, chair to toilet, and activities of daily living.

- **Gait training** to learn how to use assistive devices and to demonstrate proper movement and use mirrors for visual feedback. A physical therapist should be able to help minimize abnormalities in gait to a point where a patient is able to walk as independently as possible.

**Assistive Devices**

- Examples of gait assistive devices include: canes, rolling walkers, standard loftstrand crutches, and platform rolling walkers.
- Some of the most common durable medical equipment for use in the home include the tub transfer bench, grab bars for the bath, shower, and raised toilet seats.
- To help with foot drop, Ms. Yanelli suggests an ankle/foot orthotic made of carbon fiber.

**Exercising After Physical Therapy**

- Join a gym or wellness program, sign up for exercise classes, continue to exercise at home.
- Most communities offer wellness and activity programs at low cost or for free.

**In Summary:**

- Educate yourself on the safety and benefits of exercise.
- Physical therapy should be discussed with your doctor.
- Make sure that your physical therapy program is tailored to fit your individual needs. If your therapist is not familiar with myositis, recommend the research provided in this summary.
- With the help of your physical therapist, consider ways to continue exercise after you are discharged from therapy.
- Always keep in mind the importance of "sticking with it" and never give up!

PHYSICAL THERAPY FOR DERMATITIS:

1- HE NE LASER
2- GA AS LASER
3- PEMF

PHYSICAL THERAPY FOR CALCINOSIS:

1-PULSED US

2-LLLT

3-DFM