# JUVENILE DERMATOMYOSITIS
# UPDATE ON DIAGNOSIS & MANAGEMENT


An Essay Submitted by

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## **Abstract**:

Juvenile dermatomyositis ranks fourth among rheumatologic diseases. Two thirds of patients were reported between ages of 4 and 11.5 years girls are usually affected more than boys. The etiology still poorly elucidated. It is a multisystem disease of uncertain etiology that results in nonsuppurative inflammation of striated muscle & skin. The most typical features (heliotrope eyelid rash and Gottron's papules) are pathognomonic. JDM is diagnosed by MRI using T2 weighted images, muscle biopsy and electromyogram.The mainstay of medical therapy is based on immune suppression.

**Key words:** Juvenile dermatomyositis

# LIST OF ABBREVIATIONS

ABC : complex-streptovidin-biotin amplified complex system
ALT : alanine aminotransferase
ANA : antinuclear antibody
Arth : arthritis
AST : aspartate aminotransferase
BAL : bronchoalveolar lavage
Bcl-2 : proto-oncogene, inhibitor of apoptosis
CBC : complete blood count
CD45RO : reactive T cell antigen
CD3 : pan-T cell antigen
CD4 : helper/inducer subtype T cell antigen
CD8 : cytotoxic/suppressor subtype T cell antigen
CHAQ:Health Assessment Questionnaire score
CK : creatine kinase
CT : computed tomography
CYP : cyclophosphamide
Cyto : cytoplasmic pattern
DM : dermatomyositis
EIA : enzyme immunoassay
EMG : electromyography
ENA : extractable nuclear antigens
ESR : erythrocyte sedimentation rate
Freq : frequency
GH : growth hormone
HLA-DR : human leukocyte antigen DR locus
HTLV-1: human t cell lymphotropic virus type I
ICAM-1: intercellular adhesion molecule
ID : immunodiffusion
IIF : indirect immunodiffusion
IIM : idiopathic inflammatory myopathy
ILD : interstitial lung disease
IPP : immunoprecipitation
IS : immunosuppressive agents
IVIg : Intravenous immune globulin
IVMP: intravenous methyl prednisolone
JDM : juvenile dermatomyositis
JIIM : juvenile idiopathic inflammatory myopathy
KDa : kilodaltons (kd used in antigen names)
Ki-67 : nuclear antigen expressed in cycling cells

LDH : lactic dehydrogenase
MAAs : myositis associated antibodies
MAC : membrane attack complex of complement
MH : mechanic's hands
MMF : Mycophenolate mofetil
MMR : measles, mumps, rubella
MRI : magnetic resonance imaging
mRNA : mitochondrial ribonucleic acid
MSAs : myositis specific antibodies
MTX : Methotrexate
MW : molecular weight
Myo : myositis
NO : nucleolar
NS : nuclear speckled
Nu : nuclear pattern
P53 : tumor suppressor gene, which increases the ability of cell to undergo apoptosis
PM : polymyositis
RP : Raynaud's phenomenon
SLE : systemic lupus erythematosus
SRP : signal recognition particle
SSc : systemic sclerosis
sVCAM : serum vascular-cell adhesion molecule
TNF alpha-308A : tumor necrosis factor alpha 308 allele
UV-A : ultraviolet A rays
UV-B : ultraviolet B rays
vWF : von Willebrand factor
WB : Western immunoblotting

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# INTRODUCTION

# INTRODUCTION AND AIM OF WORK

## *Introduction:*

Juvenile dermatomyositis (JDM) is a relatively rare condition that is probably autoimmune in nature **(Campeyrot-Lacassagne & Feldman, 2007)**. JDM is a rare connective tissue disease **(Chérin, 2003)** which ranks fourth among rheumatologic diseases, after rheumatic fever, juvenile rheumatoid arthritis and systemic lupus erythematosus **(Sallum et al., 2002).**

Recent data from a National Institute of Heath-Sponsored registry have suggested that the incidence rate of JDM in the United States, between 1995 and 1998, ranged from 2.5 to 4.1 per million children, with an average annual incidence rate of 3.2 per million children below the age of 17 years **(Mendez et al., 2003).** Two thirds of patients were reported between age of 4 and 11.5 years. Girls are usually affected more than boys **(Campeyrot-Lacassagne and Feldman, 2005)**.

The etiology & pathogenesis of JDM are unknown. Many potential pathogenic mechanisms have been suggesting including a genetic predisposition, the role of triggering factors such as infectious agents, and the role of complement and soluble adhesion molecules **(Pachman, 2002).**

Although JDM is the most common presentation (with primarily skin and muscle manifestations), the underlying systemic vasculopathy can involve many systems including the gastrointestinal tract, heart, and lungs **(Campeyrot-Lacassagne & Feldman, 2007)**.

Dystrophic calcinosis is a characteristic complication reported in 30% to 70% of patients in various series **(Pachman, 1995).**

Most centers still use the diagnostic criteria & classification system proposed in 1975 **(Bohan & Peter, 1975).**

JDM is characterized by elevated serum creatine kinase levels, electro-physiologic abnormalities, and inflammation on muscle biopsy **(Briemberg & Amato, 2003).**

MRI using T2 weighted images and fat suppression can localize the active site of disease for diagnostic muscle biopsy and electromyogram, both of which are non diagnostic in 20% of instances if not directed by MRI **(Pachman, 2004)**.

The mainstay of medical therapy is based on immune suppression with first-line agent glucocorticoids and additional immunosuppressants can be used when severe side effects occur or glucocorticoids are considered to be ineffective **(Minenna et al., 2007).** Resistant cases might benefit from the use of intravenous immunoglobulin **(Campeyrot-Lacassagne & Feldman, 2007)**.

## ***Aim of work:***

- To characterize the main clinical & laboratory features of Juvenile dermatomyositis (JDM).
- To demonstrate the recent trends in diagnosis & management of the condition which might help in recognition of a therapeutic emergency and to start adequate treatment as soon as possible with better disease outcome.

# REVIEW OF LITERATURE

# Juvenile Dermatomyositis

## *Definition:*

Juvenile dermatomyositis (JDM) is a multisystem disease of uncertain etiology that results in non-suppurative inflammation of striated muscle, skin, and the gastrointestinal tract **(Cassidy, 2005).**

## *Epidemiology:*

### Incidence and Prevalence:

JDM is a relatively uncommon rheumatic disease, accounting for approximately 6% of children with a major connective tissue disease in pediatric rheumatology clinics **(Cassidy, 2005).** It is the most common pediatric idiopathic inflammatory myopathy (IIM) **(Baechler et al., 2007)**; as it is 10-20 times more common than Polymyositis in children, and tends to have a more acute and severe onset **(Chari & Laude, 2000).** In general, 16 to 20 % of all patients with dermatomyositis (DM) have onset in childhood **(Cassidy & Petty, 2001).**

JDM estimated incidence is 5-10 cases/million inhabitants/ year and prevalence of 6-7 cases/100,000 people **(Chérin, 2003).** The frequency in the United States is 0.5 per 100,000 and 0.55 and the rate found in Israel is 0.44 **(Cassidy & Petty, 2001).** A survey study in Great Britain suggested that the incidence of JDM is about 1.9 per million children below 16 years of age **(Campeyroty-Lacassagne & Feldman, 2005).**

## Age of onset:

Mean age at disease onset also varies worldwide **(Wargula, 2003)**. In the British nation-wide study, the median age at onset 6.8 years **(Campeyroty-Lacassagne & Feldman, 2005).** In the United States, the mean age at disease onset is 6.9 years **(Wargula, 2003)**. In India, in the Lucknow study, the median age at diagnosis was 12 years, with a range of 2.5 to16 years and a median duration of disease prior to diagnosis of 12 months **(Chowdhary et al., 2002).**

Among the children studied in the West Midlands, JDM showed a bimodal age distribution, with the highest annual incidence rates in children under the age of 5 years and in children of 12 to 13 years, with a mean age of onset of 7.1 years **(Gardner-Medwin et al., 2002).** In general, the average age at onset is 7 years. For boys the most common age at onset is 6 years, but for girls there appears to be one peak at 6 years and another at 10 years **(Cassidy & Petty, 2001)** as shown in **fig. 1.**

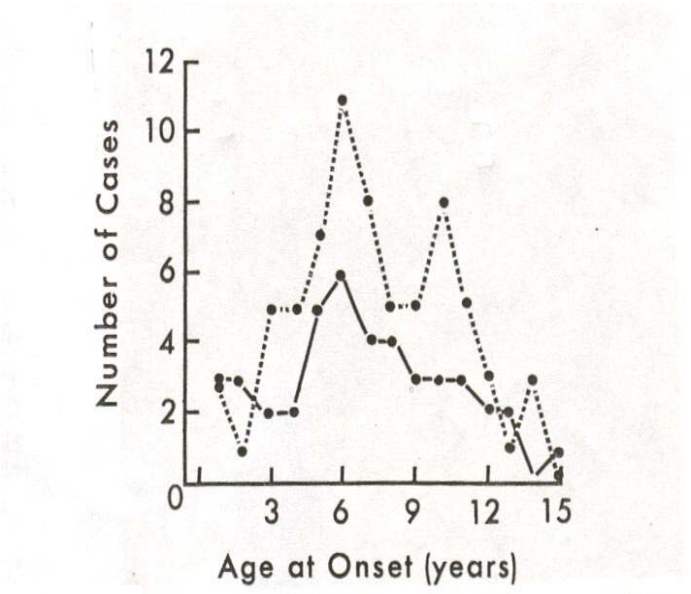


**Figure 1** Age at onset of dermatomyositis. Girls (●----●); boys (●—●).

**(Cassidy & Petty, 2001)**

## Gender ratio:

Girls are usually affected more often than boys **(Campeyrot-Lacassagne & Feldman, 2005)** in a ratio of 1.4:1 to 2.7:1 or even higher, especially in the group with onset at 10 years of age or older **(Cassidy & Petty, 2001)**. This ratio was reversed in recent review of the course of JDM in 25 Arab patients **(Shehata et al., 1999).**

The sex ratio has varied greatly in the reported studies, however, ranging from 1:1 in Singapore for children under the age of 5 years **(Ang et al., 2000)** to 5: 1( girls : boys) in the British series **(Campeyrot-Lacassagne & Feldman, 2007).** Data from the West Midlands study noted a female: male ratio of 1.75:1 **(Gardner- Medwin et al., 2002).** In the United States, girls are affected twice as often as boys. These data are similar to those from China **(Pachman, 2002).** The data from Japanese and Saudi Arabian studies show the opposite effect: a 1:2 female to male ratio **(Ramanan, 2002).**

## Geographic & Racial distribution:

Dermatomyositis is widely distributed throughout the world; although it has been most frequently reported from North American centers **(Cassidy & Petty, 2001).** Unlike some other autoimmune diseases, (e.g., systemic lupus erythematosus) there does not seem to be an over representation of black or Asian patients **(Campeyrot-Lacassagne & Feldman, 2007).**

Ethnicity of the affected child may vary by geographic location **(Wargula, 2003).** In the United States, the majority of the cases of JDM are in white children (71%) compared with Hispanics (12%), and those