

# EXERCISE AND JM

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CONFERENCE  
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**Minal Jain, PT, DSc, PCS**

*Research Coordinator, Physical Therapy Section*

*Rehabilitation Medicine Dept.*

*Mark O. Hatfield Clinical Research Center*

*National Institutes of Health*

*Bethesda, MD*

[mjain@nih.gov](mailto:mjain@nih.gov)



# OBJECTIVES

- Assessment of Muscle Strength and Function
  - MMT
    - DESCRIBE MMT 8
  - CMAS
    - REVIEW TEST ADMINISTRATION





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# MANUAL MUSCLE TESTING



# FUNCTIONAL TASKS



# ADVANTAGES

- Quantitative muscular assessment: very objective and reproducible
- Hand held dynamometry: objective, easy to use with children
- Manual muscle testing: ease of administration, can be administered at any location with any level of strength
- Functional tasks: no need for specialized equipment

# DISADVANTAGES

- Quantitative muscular assessment: very expensive, time consuming, intimidating for children
- Hand held dynamometry: expensive, children have difficulty understanding instructions
- Manual muscle testing: subjective, subjective, moderate to low inter-rater reliability for individual muscles, esp with mild weakness
- Functional tasks: difficult to quantify changes





# HISTORY

- Medical Research Council's 5 point scale
  - Used by many physicians
  - Used in previous studies (Florence 1984)
  - Use of + ' s and - ' s, between whole numbers
  - Expansion of the 5 point into 10 points; but not validated
- Kendall's 10 point scale
  - Introduced in 1993
  - Utilizes 0-10 scale
  - Eliminates + ' s and - ' s
  - Easier for statistical analysis





# WHY MMT??

- Widely used in myositis clinical trials as part of primary endpoint
- Commonly and easily used in clinics to follow patient progress, responses to therapy
- Accepted by rheumatologists and neurologists
- Validated tool:
  - Excellent internal reliability
  - Very good to excellent inter- and intra-rater reliability (total scores, not individual muscles)
  - Good construct validity: correlation with other measures of myositis activity
  - Excellent sensitivity to change





# DEVELOPMENT OF THE CORE GROUP OF 8 MUSCLES:

- Neck flexors
- Deltoids
- Biceps
- Wrist extensors
- Gluteus maximus
- Gluteus medius
- Quadriceps
- Ankle dorsiflexors



# CHILDHOOD MYOSITIS ASSESSMENT SCALE



# OBJECTIVES

- Provide participants with background and validity information on the Childhood Myositis Assessment Scale
- Participants will be able to perform and score all 14 maneuvers of the Childhood Myositis Assessment Scale



## BACKGROUND

- Designed to assess proximal muscle strength, function, and endurance for children with idiopathic inflammatory myopathies from 2 years to adulthood
- 14 maneuvers developed from 2 existing tools
- Originally published in 1999



# VALIDITY

- 108 children with juvenile IIM were evaluated twice using various measures of physical function, strength, and disease activity
- Very good interrater reliability
- Good construct validity
- Moderate to strong responsiveness in large cohort of children with juvenile IIM



# BASICS

- All 14 maneuvers are to be assessed, one after the other, in the order listed on the CMAS Scoring Sheet.
- Items needed: stop watch, exam table, chair, stepstool
- Takes approximately 10-15 minutes to administer
- Patients serve as their own control for serial testing



# OBJECTIVES:

- Review of literature
- Current recommendations for exercise





# OUTDATED PERSPECTIVE

- No exercises prescribed
- Believed exercise may cause muscle damage and increase inflammation (studies show an increase in muscle inflammation after strenuous ex – i.e marathoners)
- Concern of development of calcinosis in areas of stress within the muscle (now known to be a complication of active and uncontrolled jdm)
- “waiting” for pharmacological intervention to take effect





# REVIEW OF LITERATURE

- Malliard 2005
- 10 children with definite or probable JDM were subjected to a single bout of strengthening ex
- Strength was assessed via HHD – neck flexors, shoulder abductors, hip abductors, knee extensors and hamstrings
- Muscle inflammation measured via MRI T2-weighted images of the thigh..before exercise, immediately after exercise and 60 mins post exercise
- No significant muscle inflammation was noted



# REVIEW OF LITERATURE

- Klepper 2008
- Children with rheumatic diseases who are sedentary develop secondary impairments: aerobic impairments, muscle weakness, decreased bone strength, and functional limitations
- “Increased levels of moderate to vigorous physical activity and structured exercise may improve exercise capacity, performance of daily activities, and overall quality of life.”



# REVIEW OF LITERATURE

- Omari 2010
- Set of monozygotic twins, one with JDM, one without
- Started on a 16 week ex program –combined strength training and aerobic ex on the treadmill
- At the end ,both exhibited an increase in the ability to use more weight with their strengthening ex, aerobic ex.
- No significant change was noted with MMT , but noted changes with CK levels.



# REVIEW OF LITERATURE

- Omari 2012
- A structured 12 week aerobic and strengthening ex program in 10 children helped improve:
  - Strength via: MMT
  - CMAS was improved (combination of strength and endurance skills)
  - VO2 improved
  - PEDS-QL improved
  - Resting HR decreased



## REVIEW OF LITERATURE

- Haber 2012
- 30 kids, 8-18 yrs of age, with JDM, enrolled in ex program
- Including aerobic (treadmill) 3-4 X/wk
  - Interval training
- Strengthening 2-3 X/wk
  - Interval training
- Goal of the study was to provide efficacy of a structured aerobic and strengthening program in children with JDM



# REVIEW OF LITERATURE

- Riisager 2013
- 10 patients (16-42 yrs of age) , in remission from JDM
- 12 week cycle ergometer exercise program
- VO<sub>2</sub> max was determined before and after intervention
- 8 pts completed the study, one stopped at 9 wks and one dropped out of the study.
- Training increased VO<sub>2</sub> max and W max by 26% and 30%



# EXERCISE PRESCRIPTION

- While each child should be evaluated individually , the literature suggests it is safe to prescribe aerobic and strengthening ex in child with JDM, supervised by the medical/rehab team
- It is best to evaluate current function using the assessments available: MMT, CMAS, CHAQ
- Start them on the ex program and then re-evaluate in 10-12 weeks, using the same assessments



**Table 13.1. Exercise and disease activity.\***

<b>Exercise Type</b>						
	Active Assisted ROM, Passive ROM	Active Assisted ROM, Passive ROM	Isometric Strengthening Stretch, Active Assisted ROM, Active ROM	(Light) Recreational, Light Aerobic, Isometric Strengthening, Stretch, Active ROM	Recreational Aerobic, (Low Weight) Isotonic and Isometric Strengthening, Stretch, Active ROM	Recreational Aerobic, PRE, Isotonic and Isometric Strengthening Stretch, Active ROM
<b>Myositis Disease Activity</b>	Initial Diagnosis, Flare	Severe Activity	Moderate Activity	Mild to Moderate Activity	Mild Activity	Inactive
<b>Muscle Strength Level</b>	Below Gravity		Against Gravity			

\*Specific exercises are modified based on bone density levels.  
Abbreviations: ROM = range of motion; PRE = progressive resistance exercise.

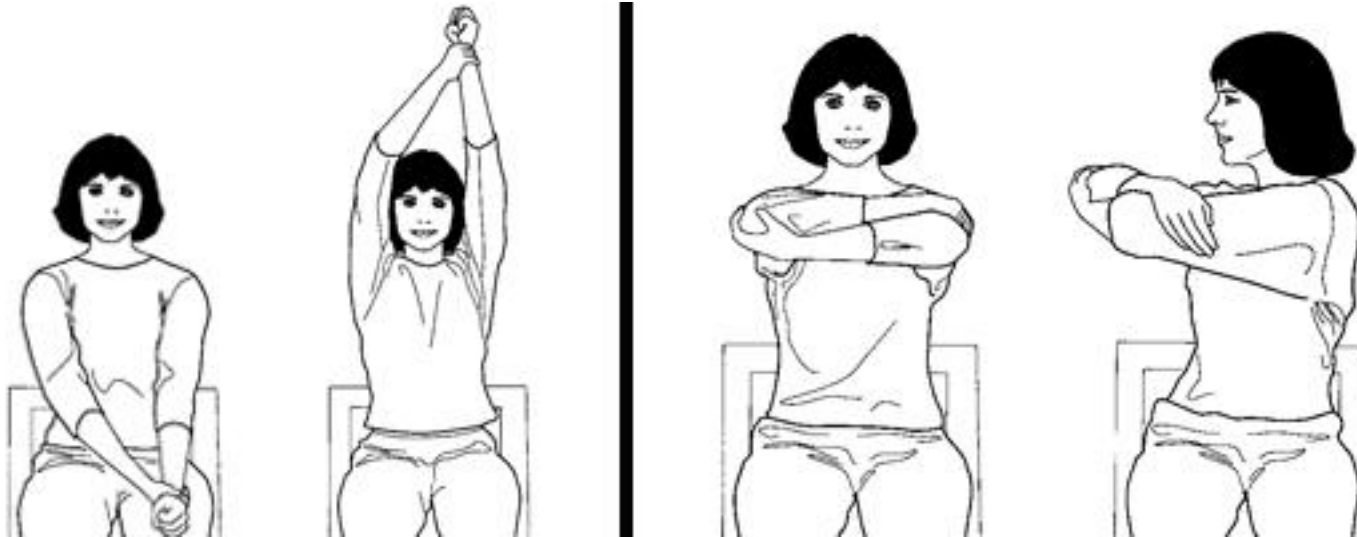




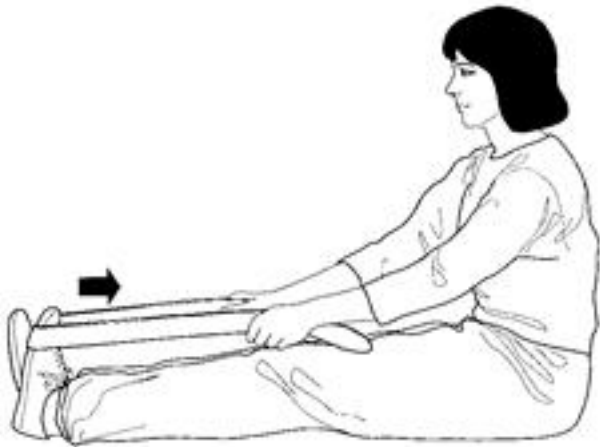
# PASSIVE RANGE OF MOTION



# ACTIVE-ASSISTED RANGE OF MOTION



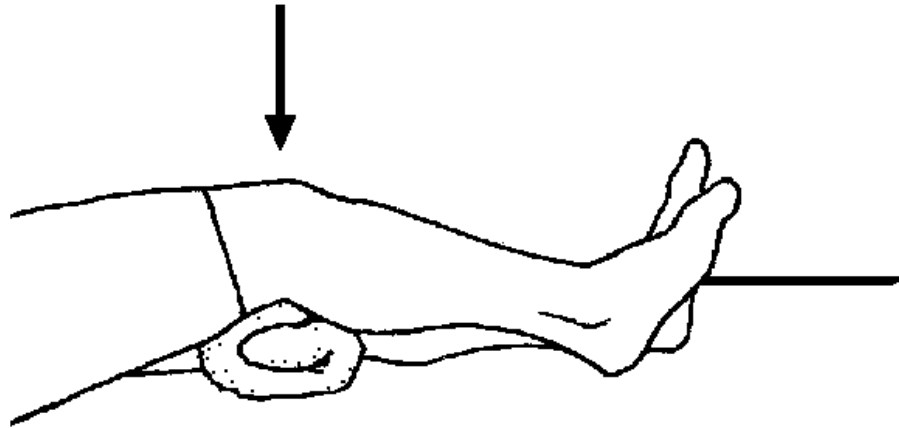
# STRETCHING EXERCISES



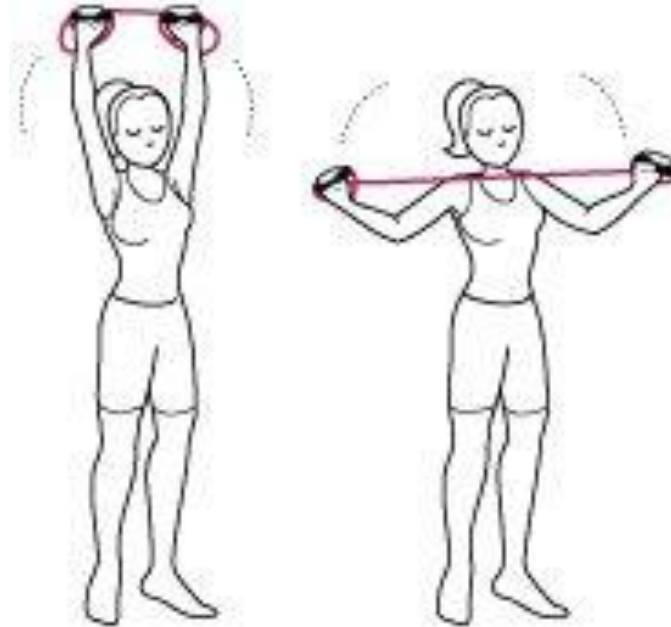
# STRETCHING EXERCISES



# ISOMETRIC STRENGTHENING



# RESISTANCE TRAINING



# RESISTANCE TRAINING



# AEROBIC EXERCISES







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# AEROBIC EXERCISES



# AEROBIC EXERCISES



# QUESTIONS??

**MJAIN@NIH.GOV**



# Thank you

**CURE JM**  
**Drs. Rider and Mellins**  
**All of our patients**

